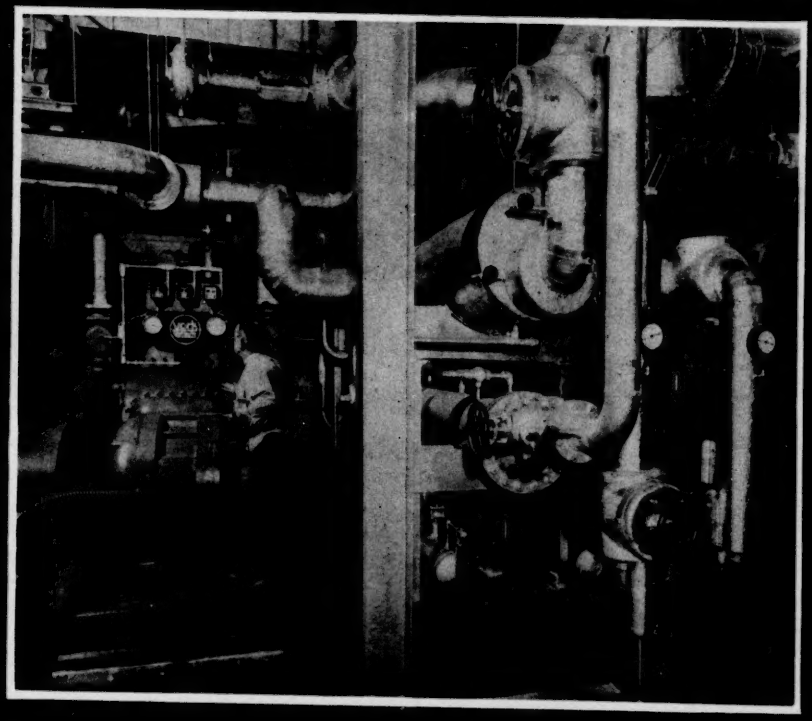
ICE and REFRIGERATION



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MAY • 1951

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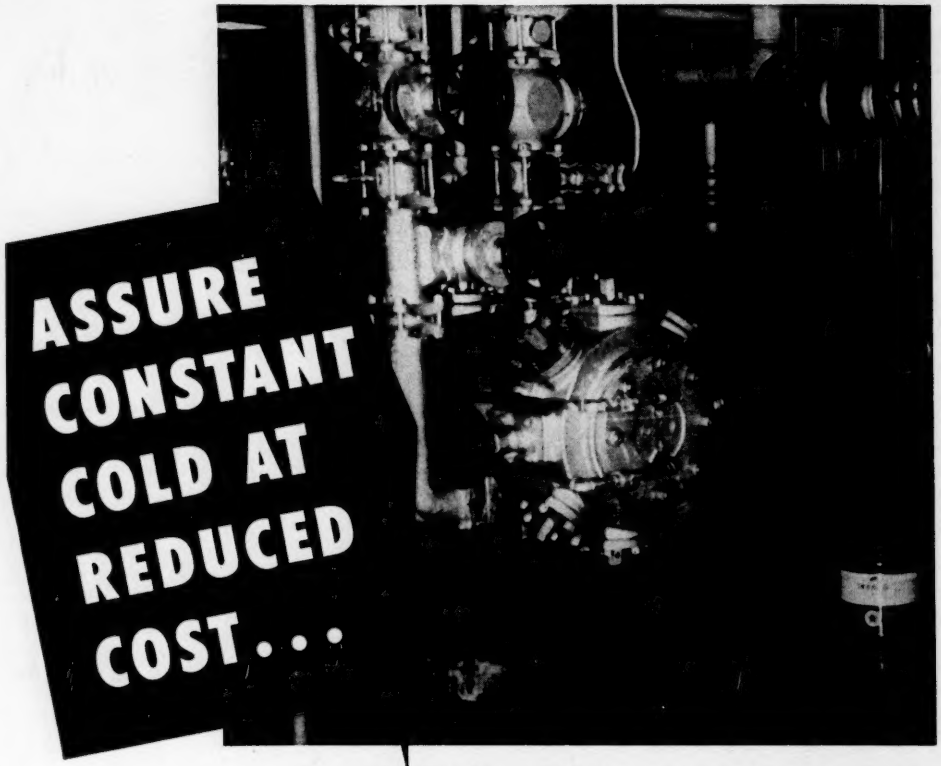


by lubricating compressors with TEXACO CAPELLA OILS

The importance of uninterrupted compressor operation is obvious. You can assure it by lubricating with *Texaco Capella Oils*—the oils that keep compressors and systems clean. At the same time, you can count on lower maintenance costs.

Texaco Capella Oils assure freedom from carbon, gum and sludge problems because of their high resistance to oxidation. They have low pour tests and do not react with refrigerants. *Texaco Capella Oils* keep compressor piston rings free and valves functioning properly . . . reduce wear.

A Texaco Lubrication Engineer will gladly recommend the proper *Texaco Capella Oils* to use for your particular compressors and operating conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

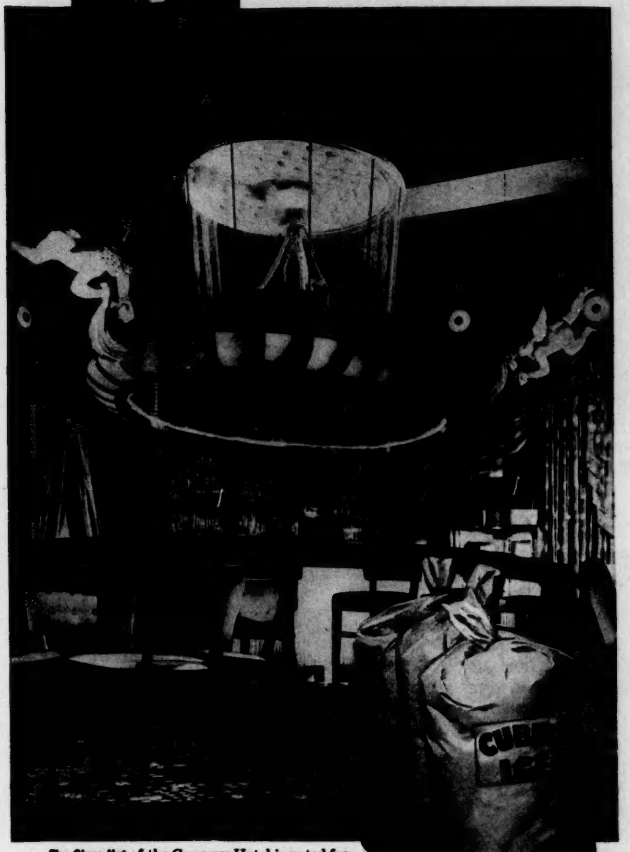
TEXACO Capella Oils

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. See newspaper for time and station.

"For a fine hotel, Packaged Processed Ice is a sanitary necessity"

says Nino Bignami, Director Food & Beverage, Congress Hotel, Chicago Illinois



The Glass Hat of the Congress Hotel is noted for its glamour and gaiety on Chicago's famous Michigan Boulevard.

Wet-Strength Paper Ice Bags have tremendous strength even when soaking wet...thanks to a water repellent resin that binds the fibres of the paper firmly together.

The Extra Service That Makes the Sale

SMART BARS and eating places can't take chances with processed ice. It must be 100% free of contamination, dirt, foreign particles. That's why so many of them today insist on processed ice packaged in Union Paper Ice Bags. The wire tie locks out dirt, bars spillage or pilferage.

The Union one-trip Paper Ice Bag cuts your costs, too. The sturdy wet-strength paper—two layers thick—retards melting. Handling is speeded up—at the ice processor, loading dock, delivery point.

You'll find, too, that customers use more ice; it is so easy for them to ice from the handy paper bag.

Month after month more ice companies build new business with the Union Paper Ice Bag. Join the parade. Write for free samples today.

ONE TRIP

UNION Paper Ice Bags

A product of the **UNION BAG & PAPER CORPORATION** • 253 Broadway, New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Classine, Laminates

Combating a 12,000 gpm Corrosion Threat in the "AIR-CONDITIONED CITY"

J. RUSS BATT, Architect on Hotel Garage; REG F. TAYLOR, Consulting Mechanical Engineer; CHAS. G. HEYNE & CO., Mechanical Contractors on Air Conditioning; KANE BOILER WORKS, Fabricators of 18" pipe; O. W. ROSIN, Chief Engineer, Rice Hotel.

To completely air-condition the 1000-room Rice Hotel at Houston, Texas, 12,000 gallons of water per minute must be circulated between the engine room and the giant cooling tower on the roof of the hotel garage, 700 feet distant. To combat the inescapable corrosive attack, the engineers used Byers Wrought Iron plates in fabricating the 18-inch pipe which handles the flow. A substantial quantity of Byers Wrought Iron pipe was also supplied for cooling and condenser water lines within the hotel building.

Houston, which claims more air-conditioning than any other city in the world except Washington, D.C., calls itself the "Air-Conditioned City." This concentration of installations gives engineers and users ample opportunity to determine the worth of various materials. It is significant that genuine wrought iron appears in practically every specification.

The durability of genuine wrought iron in services like these comes from the unusual character of the material. Tiny fibers of glass-like silicate slag, threaded through the body of high-purity iron, halt and "detour" corrosive attack. The fibers also anchor the initial protective scale, which shields the underlying metal just as a scab protects a wound.

If you are contemplating any air-conditioning installations, or are concerned with the maintenance of any existing systems, you will find some helpful information on the use of genuine wrought iron in our bulletin, WROUGHT IRON IN REFRIGERATION, ICE SKATING RINKS AND AIR-CONDITIONING SYSTEMS. Ask for a complimentary copy.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N.Y.

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Ice and Refrigeration

VOLUME 120 NUMBER 5

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May 1951

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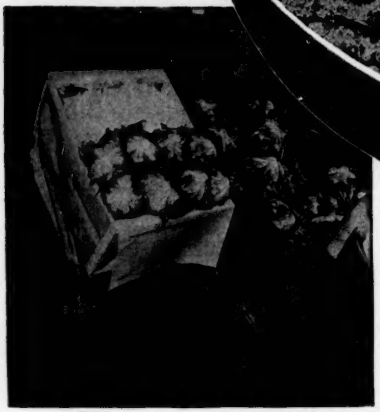
Delivered Delicious...

A final layer of Vogtice is put in place before closing the crate.

Layers of Vogtice are placed on the crate bottom and between the courses of lettuce heads.

Harvesting lettuce in the field with a traveling conveyor which delivers the heads to a truck.

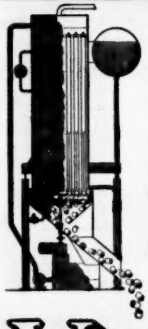


...straight from the Nation's "Salad Bowl"

Head lettuce from the Salinas Valley, California "Salad Bowl" graces the tables in American homes from coast to coast. In the season, shipments will average 135 refrigerator cars daily.

The J. J. Crosetti Packing Co. with headquarters at Watsonville, California is one of the largest growers and packers and operates a battery of four Vogt Automatic Tube-Ice Machines to provide Vogtice for carload shipments. The crates of iced lettuce are loaded in refrigerator cars and then a protective blanket of Vogtice is blown over them to retain freshness and crispness for distant markets.

Vogtice is playing an increasingly important role in the cooling, processing and preservation of foods and beverages. Our new Bulletin TI-3 gives the general information and will be sent upon request.



HOW THE TUBE-ICE MACHINE FUNCTIONS

In making ice, water is pumped to the top of the freezer and flows downward along the inside walls of tubes into a water tank. Refrigerant in shell surrounds tubes and freezes water into cylinders of ice. An automatic timing mechanism operates suitable valves to control all functions of the machine. Ice is freed from the tubes by thawing when the refrigerant is displaced by high pressure warm gas from the compressor.

Employing direct application of the refrigerant, all expense incidental to other systems is eliminated.

Patent Numbers 2,200,424, 2,230,234, 2,300,308, 2,444,514, 2,453,140.

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the original green ice-tempering tablets

1 CLEARER ICE—TEMPLETS completely or partially eliminate the cloudy veil, white butts and heavy cores which take away from the "sales appeal" of your ice.

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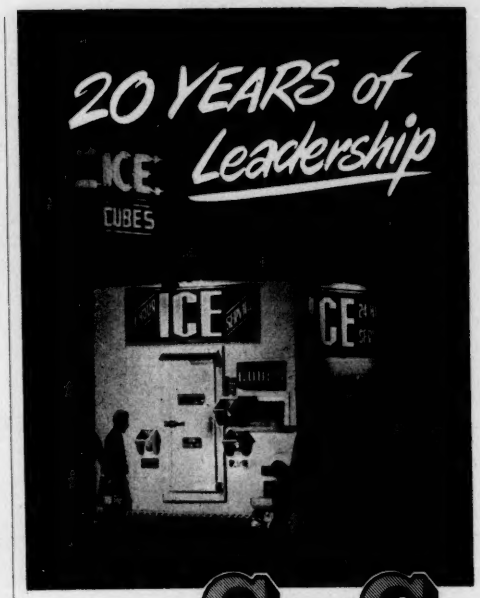

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Ice Vending Stations

ICE VENDING MACHINES

FIRST TO PROVIDE the ice industry with automatic ice merchandising equipment . . . the low cost, high profit method of ice distribution that makes money while you sleep . . . S&S has for over twenty years led the field in modern design, mass production methods, and dependability.

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Shipped completely assembled and ready to operate on arrival, S&S automatic Ice Vending Stations and S&S Vending Machines are built to give years of profitable service with minimum maintenance.

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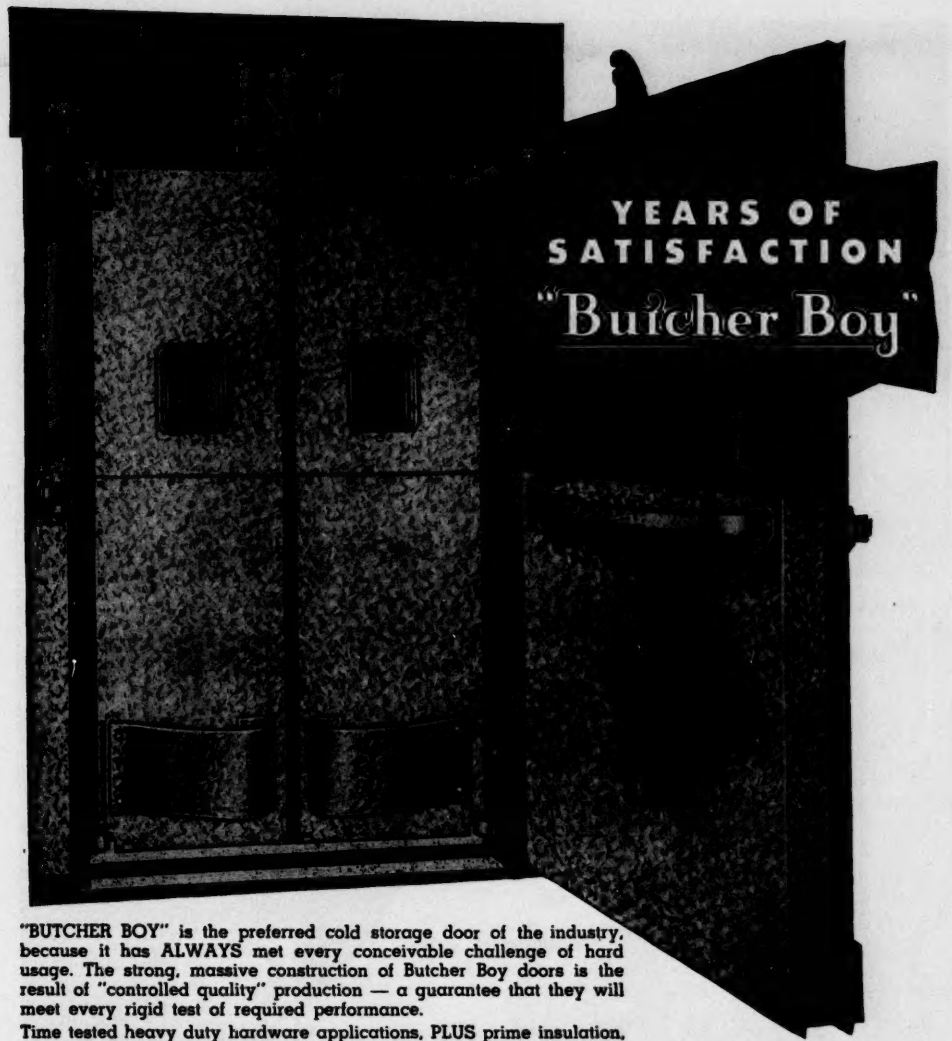

"BUTCHER BOY" is the preferred cold storage door of the industry, because it has ALWAYS met every conceivable challenge of hard usage. The strong, massive construction of Butcher Boy doors is the result of "controlled quality" production — a guarantee that they will meet every rigid test of required performance.

Time tested heavy duty hardware applications, PLUS prime insulation, PLUS 100% Douglas Fir Construction is a resultant product equalled by none — BUTCHER BOY. Write for free bulletins today.

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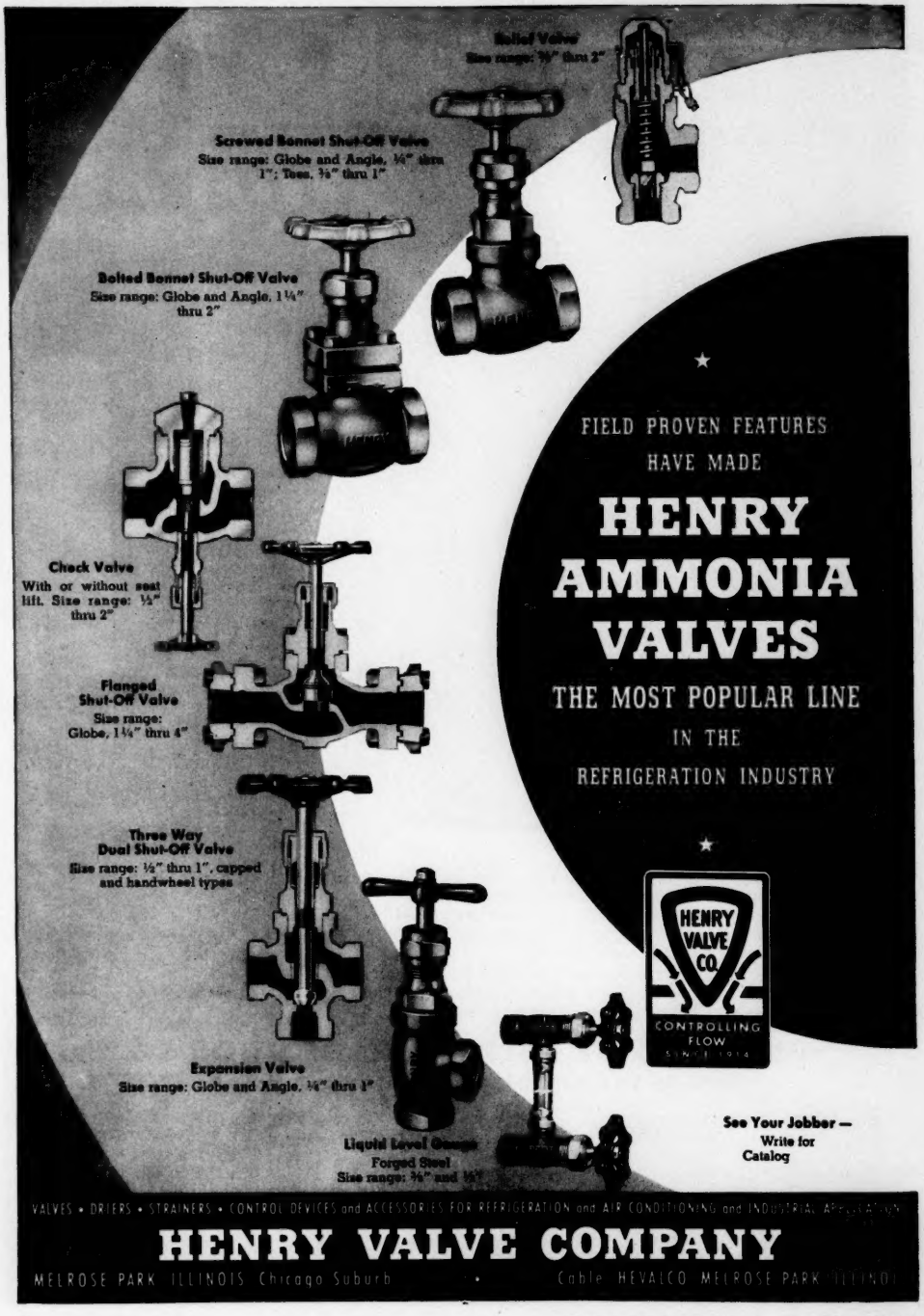
Relief Valve
Size range: 3/8" thru 2"
Screwed Bonnet Shut-Off Valve
Size range: Globe and Angle, 1/4" thru 1"; Tees, 3/8" thru 1"
Bolted Bonnet Shut-Off Valve
Size range: Globe and Angle, 1 1/4" thru 2"
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With or without seat lift. Size range: 1/2" thru 2"
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Size range: Globe, 1 1/4" thru 4"
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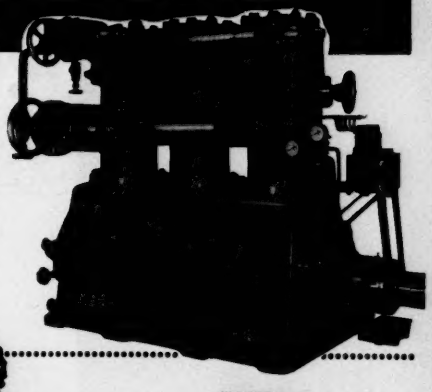
IN REFRIGERATION
it's All in knowing
HOWE



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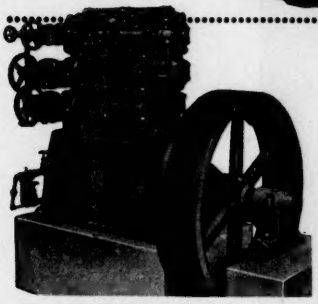
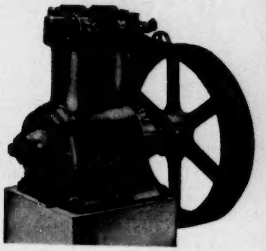
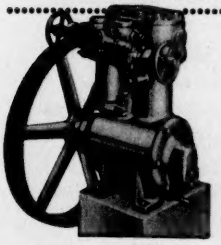


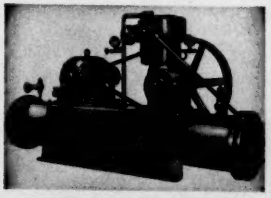
MULTIPLE-EFFECT COMPRESSOR
15 to 150 tons



MODEL G COMPRESSOR
10 to 20 tons

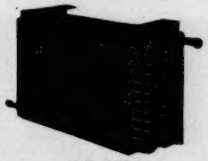


MODEL A COMPRESSOR
2 to 8 tons

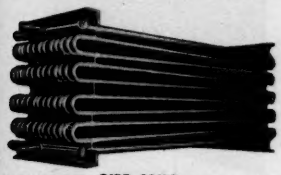


AMMONIA COMPACT UNITS

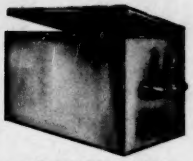
HOWE POLAR CIRCLE COILS



FIN COILS



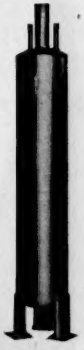
PIPE COILS



ICE BUILDER TANKS

UNIT COOLERS

RAPID FREEZE UNIT COOLER



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SHELL AND TUBE CONDENSERS AND COOLERS

HOWE

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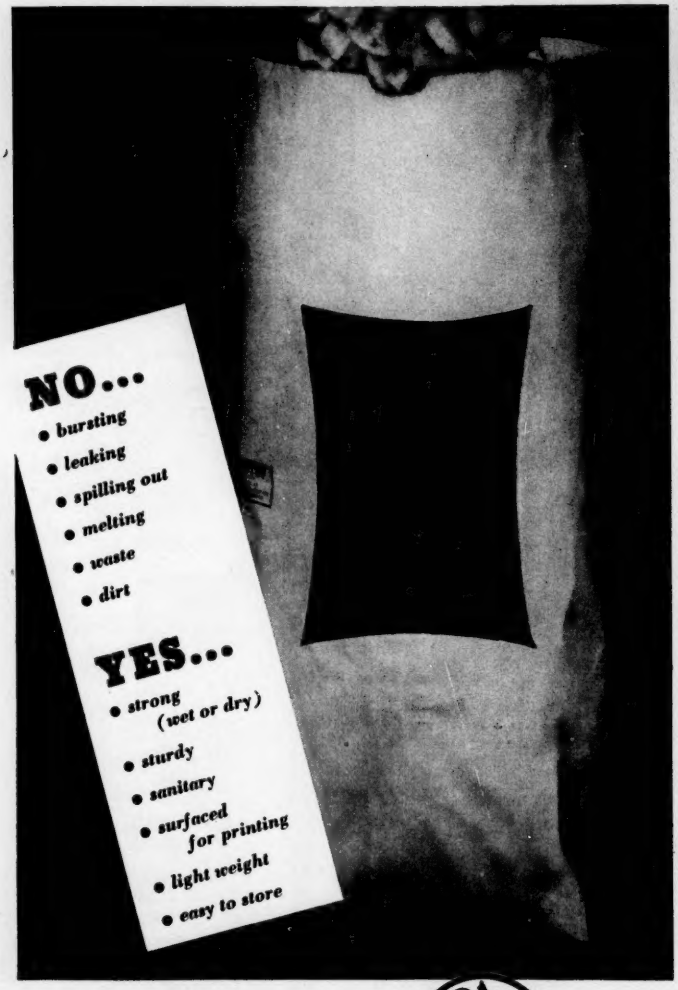
INTERNATIONAL ICE BAGS



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Printed bags "TELL and SELL."
That's the easiest, most economical way to keep your product and service sold—
Made of HYDROTUF* paper.
The extra strong wet strength paper.

INTERNATIONAL PAPER COMPANY
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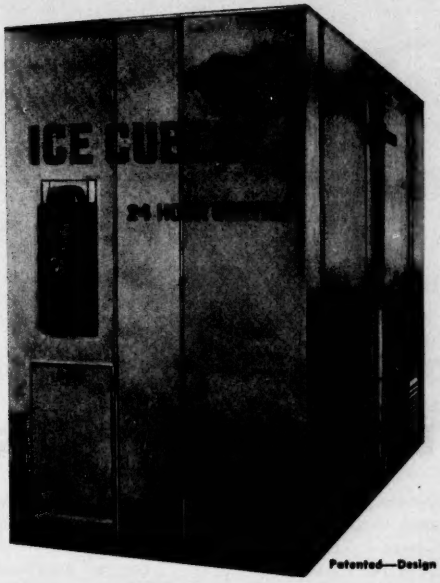
New POLAR PREMIUM CUBED and CRUSHED ICE VENDING STATION



Patented—Design Patent Applied For

The new POLAR *Premium* Ice Vendor has a belt capacity of 50 ten-pound bags . . . . . storage for 200 bags . . . . . *Priced less than $1500.00*

THERE IS MORE TO A VENDING STATION THAN MEETS THE EYE. POLAR PRODUCTS ARE BUILT OF THE FINEST MATERIALS BOTH *EXTERNALLY* AND *INTERNALLY* to give LONGER, MORE ECONOMICAL, TROUBLE FREE SERVICE.

Remember these POLAR features:

1. Completely covered with embossed aluminum.
2. Armstrong fibreglas insulation.
3. Aluminum foil vapor seal paper.
4. Automatic electric defrost.

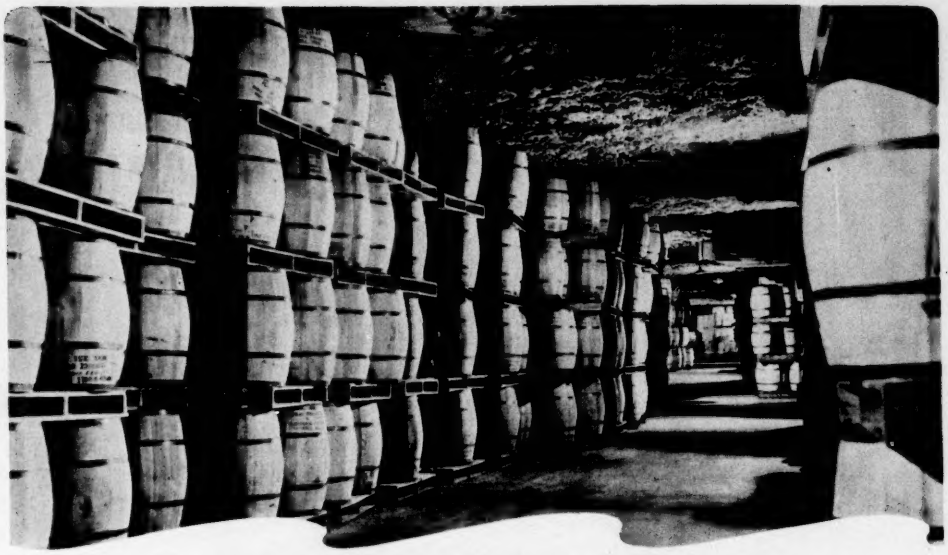
ALL of these special POLAR features are included in the new Premium ice vending units.

1. Gives maximum utilization of refrigerated space. Ice can be bagged in station.
2. Fits in a small space, easily placed. Cabinet is 8'-10" long, 6'-6" high, 46" wide. Specially suited for heavily populated downtown locations.
3. Shipped ready to operate—just plug in. Equipped with front light and time clock.
4. Beautiful in appearance. Identical material as used in regular POLAR line.
5. One piece aluminum weatherproof roof.

For further information and descriptive literature — write

REFRIGERATION ENGINEERING COMPANY • **Montgomery, Minnesota**

MANUFACTURERS OF POLAR ICE AND DAIRY VENDING EQUIPMENT THAT PAYS FOR ITSELF



GIGANTIC UNDERGROUND STORAGE USES

Frick Refrigeration

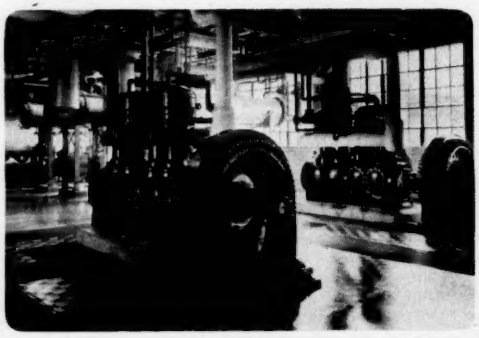
Originally a limestone quarry, the Natural Cooler Storage of the United States Department of Agriculture near Atchison, Kansas, is one of the largest refrigerated warehouses in the world, having capacity for 3,000 carloads.

A temperature of 32 degrees F. is held in the great cave by two Frick 4-cylinder compressors, driven by motors totalling 600 horsepower.

Other large cold storages using Frick refrigeration, including those holding 44 million pounds of frozen foods for Seabrook Farms at Bridgeton, New Jersey, are in service throughout the world.

For that important cooling job of yours, specify Frick air conditioning, refrigerating, ice-making or quick-freezing equipment. Frick equipment is furnished in all commercial and industrial types and sizes—there's a Frick refrigerating machine to suit the exact needs of your business.

Get quotations now: write, wire, phone or visit: any of these Frick Branches in



Frick Compressors with Motors Totalling 600 Horsepower at Natural Cooler Storage

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Cincinnati 2, O.	3705 Carew Tower
Dallas 1, Texas	805 Tower Petroleum Bldg.
Kansas City 6, Mo.	424 Dwight Bldg.
Los Angeles 14, Calif.	Room 702, 656 S. Los Angeles St.
Memphis 3, Tenn.	1012 Sterick Bldg.
New Orleans 12, La.	910 Queen & Crescent Bldg.
New York City 17	370 Lexington Ave.
Oklahoma City 3, Okla.	127 N.W. 13th St.
Palatka, Fla.	Abstract Bldg.
Philadelphia 7, Penna.	614 Witherspoon Bldg.
Pittsburgh 22, Penna.	508 Empire Bldg.
Saint Louis 2, Mo.	320 North Fourth St.
Washington 5, D.C.	1229-31 Shoreham Bldg.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U.S.A.

Also Builders of Power Farming and Sawmill Machinery

In The Spotlight

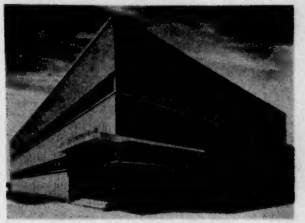
ICE PRICES for 1951 show a slight general average increase all along the line, for all classes of ice and in all sections of the country, according to the annual survey by ICE AND REFRIGERATION. The grand average of all ice prices will be $9.08 per ton compared to $8.71 in 1950 and $8.73 in 1949. Prices are shown from 301 distributors, located in 292 cities. See page 15.

MECHANIZED handling of packages in refrigerated warehouses is known to be economical but in multi-floor plants this method presents problems. The article on page 23 tells the story of one such warehouse which adopted palletizing, adapting it to fit their needs with wholly satisfactory results.

FROZEN FOOD distribution and warehousing is undergoing changes, with a trend toward new efficiencies, but which still embodies problems that must be met by the packer, distributor and warehouseman. This is of great concern to refrigerated warehousemen whose viewpoint was expressed in a paper at the recent National Frozen Food convention and in a paper which is published in this issue, starting on page 26.

A CONTROLLED Materials Plan allocating the use of steel, copper and aluminum will be put in operation by the National Production Administration for the third quarter of 1951. A news release on this order is published on page 28.

THE STORAGE TIME of Emperor and Almeria grapes has been made a special study by the Oregon Agricultural Experiment Station in cooperation with the Refrigeration Research Foundation. This first of a series of two articles gives some of the preliminary findings. See page 43.



COVER: Gulf States Utilities Co., Beaumont, Texas office building is heated and cooled by the Freon heat pump installation illustrated on the front cover.

THE NATIONAL defense program is gradually taking shape and there are features in it which apply to most lines of industry. The regulations which affect the ice industry so far, and the position of the industry in this respect are covered in a bulletin issued by the National Association of Ice Industries and published on page 31.

A CHICAGO ICE company has developed a number of retail outlets among food and drug stores for small cartons of ice cubes. For details see page 36.

NEW MARKETS for ice have been opened by a New Mexico ice man who is selling ice to filling stations and other outlets for use in jug-icing and Sno-Kones. Both of these have been heavy tonnage builders. See story on page 33.

A MODERN ICE plant has been constructed by the Lake Simcoe Ice & Fuel Ltd. at Leaside, Ont., Canada. The entire plant is on one level, to provide efficient operation with a minimum of manual labor. Pictures and description of the new plant appear on page 35.

A HOME ACCESSORIES store in Gary, Ind., is paying handsomely for an ice company in that city. See page 34.

DAIRY AND POULTRY requirements of the armed forces for 1951 are discussed in the article on page 41 by a representative of the Quartermaster system. Military needs are expanding, he says, which will considerably increase the use of these products. See page 41.

COLD STORAGE HOLDINGS during March showed a slight decrease over the previous month, with no change in cooler space, but a decrease of four points in freezer occupancy. Orange concentrate increased from eight to almost ten million gallons, but other frozen fruit items were in lesser supply. These and other data are given in the monthly report on page 47.

HIGH VACUUM precooling for produce, as a substitute for ice packing, is being used commercially for California fruits and vegetables and gives promise of making an outstanding contribution in the field of produce cooling. This process is described and illustrated in the article starting on page 49.

THE ICE and tea industries have joined Sunkist lemons in a summer advertising campaign to sell more iced tea. See story on page 30.

REFRIGERATOR and freezer manufacturers have joined in formation of a group to work on problems of the industry in the mobilization program. See story on page 62.

THE A.S.R.E. spring meeting will be held in Detroit, Mich., May 27-30. Details of the technical and entertainment programs are given on page 61.

REFRIGERATING engineers held their second annual roundup for a pre-season refresher course in operating methods at St. Louis, March 31. The meeting was sponsored and arranged by the St. Louis Chapter, National Association of Practical Refrigerating Engineers. For report on conference see page 59.

a low cost G-W trio for every ice house!

G-W TYPE "F" SCORING MACHINE

It's semi-automatic, scores cleanly and evenly and can be adjusted to your own size requirements. It needs no pit or foundation . . . not even any holding down bolts. Type "F" is semi-portable and operates fast and efficiently. One man can score an average of three 300 or 400 lb. cakes a minute. Sturdy and dependable, you can bank on Type "F" to give you years of trouble-free service.

ALWAYS INSIST ON G-W SAWS

Keep your Cubing and Scoring Machines at their original high peak of efficiency . . . always insist on G-W Saws for replacement. Remember . . . there's only one *genuine* Gifford-Wood Saw and it costs no more than regular blades.

EVERYBODY IS TALKING ABOUT THE NEW "ECONOMISER"

Initial low cost plus low operating maintenance have combined to make the "ECONOMISER" a top favorite with cost-wise ice manufacturers from coast to coast. Compact, only 7'6" high, the "ECONOMISER" breaks, sizes, and delivers to the bagging hopper, three separate grades of ice at an average rate of 200 pounds per minute. No buckets or chains to get out of order. For complete information on these or any units in the complete line of G-W ice equipment write your nearest Gifford-Wood branch office.

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6388

1951 ICE PRICES SHOW INCREASE

Tabulation of all classes of ice representing all sections of country show slight increase in prices established for 1951 as reported by 301 distributors in 292 cities

The following tabulation of ice prices for 1951 indicates a slight increase all along the line for all classes of ice and in all sections of the country. These figures were taken from a survey, an annual feature of the May issue of ICE AND REFRIGERATION, representing 48 states, the District of Columbia and Canada, and based upon replies from 301 ice distributors from 292 cities.

The final grand average of all classes of ice advanced from $8.71 in 1950 to $9.09 per ton in 1951, an increase of 37 cents per ton. In 1949 the general grand average was $8.73 per ton. Domestic ice advanced from an average of 69.4 cents to 73.2 cents per 100 lbs., an increase of 3.8 cents. Commercial ice went from an average of 51.2 to 53.8 cents per 100 lbs., a difference of 2.6 cents. Wholesale ice advanced from $5.97 to $6.11 per ton, an increase of 14 cents. Price of ice at plant platform and sales stations (per 100 lbs.) jumped from an average of 58.2 cents in 1950 to 62.4 cents in 1951, an increase of 4.2 cents per 100 pounds.

The increase is shown for all classes of ice, carload quotations having the smallest change of only 8 cents per ton, in fact, carload prices show a small decrease over last year in the southern and western sections. Car icing went from $6.76 to $6.96 and price to dealers went from $6.14 to $6.29.

The biggest change was for domestic and commercial as shown by the following sectional averages per 100 lbs.: Eastern states from 55.6 to 56.4 cents; Southern states from 53.4 to 57.9 cents; Midwestern states from 56.0 to 59.5 cents; Western states from 64.1 to 67.0 cents; general overall average from 57.3 to 60.2 cents, an increase of 2.9 cents per 100 lbs.

All of these figures are based upon arithmetical and not weighted averages since it is obvious that it would not be possible to obtain actual tonnage figures on such a large number of classifications representing both large and small markets.

The smaller tables following the large table give summaries and breakdowns for the different sections and for the six main classifications of ice prices.

In this tabulation and analysis of ice prices for 1951, the outstanding fact is that prices will be up (slightly) from 1950 for all classes of ice, and in all sections of the country. Other important trends include increased sales of crushed and sized ice, more ice being sold for fruit and vegetable icing, and additional installations of vending stations. For providing the information upon which this report is based, appreciation is expressed to the 301 distributors who answered the questionnaire. For them and for others, it has more than current value, since it shows the trend of prices running back several years.

Chart Shows 20 Year Trend

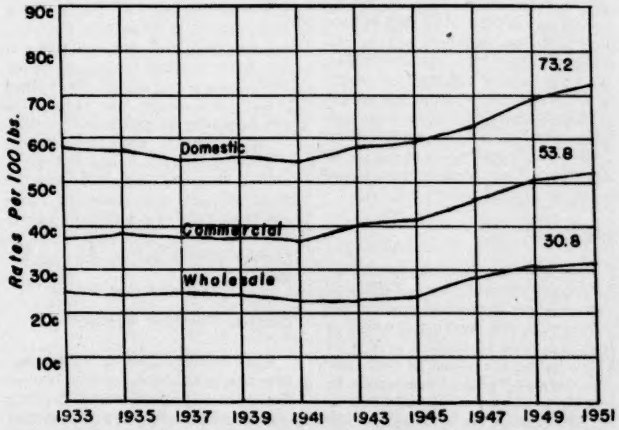
The chart reproduced below shows average prices for domestic, commercial and wholesale ice over the last 20 years. It will be noted that only slight changes have been made during that period, with all present average prices being only slightly more than those for 1933, a gradual upward trend having started in 1941.

Crushed and Sized Ice

Reports on sales of crushed and sized ice show a continuing trend toward selling ice in this form. Of the 301 distributors, 270 reported such sales, as compared to 256 from 274 concerns last year. Sales of both crushed ice and cubes are reported by 124 plants and of crushed ice only by 146 plants.

The price range for commercial sized ice is from a low of 40 cents to a high of $1.50 with an average of 73.6 cents per 100 lbs. Last year the range was from 35 cents to $1.50 with an average of 67.8 cents per 100 lbs. In 1949 the average was 62.8 cents. Twenty-six distributors reported prices of $1.00 or more per 100 lbs. as compared to 17 last year and 22 reported low prices of 50 cents per 100 lbs. as compared to nine reporting prices of 40 cents or less per 100 lbs. last year.

There is a continuing pronounced trend toward basing prices of crushed ice on basis of 100 lbs. Last year 17 out of 274 plants quoted prices on



Trend of average prices for domestic, commercial, and wholesale ice for twenty years, 1933-1951.

basis of tons or bushel. This year only 12 out of 301 plants quoted on basis of per bushel. These quotations are from a low of 30 cents to a high of 70, with an average of 48 cents per bushel. Last year the range was from 30 to 86 cents, with an average of 43.6 cents per bushel.

For crushed ice to the domestic trade the price range is from a low of 40 cents to a high of $2.00, with an average of 90.0 cents per 100 lbs. Last year the range was from a low of 50 cents to a high of $2.00 with an average price of 82.1 cents per 100 lbs. In this classification also the trend is toward basing prices on 100 lbs. Eleven companies quoted prices per bushel from a low of 30 cents to a high of 90 cents with an average of 56.9 cents per bushel. Last year 14 companies quoted prices per bushel from a low of 40 cents to a high of $1.00 and an average of 58.3 cents per bushel.

The tendency toward charging more for sized or crushed than for block ice continues, although a fair number continue to charge the same for commercial use. A general rule of thumb appears to be to charge 10 cents more per 100 lbs. for crushed ice. An interesting comparison in this connection is that the general average for light commercial shown in Table VI for block ice is 60.8 cents per 100 lbs. while the average shown above for crushed ice is 73.6 cents, a difference of 12.8 cents per 100 lbs.

Volume of Crushed Ice

The volume of crushed ice appears, from these figures, to have suffered a slight setback from last year, possibly because of reduced tonnage in all classes. Estimated sales for 1951 from 138 distributors amount to 353,600 tons (average 2563). For 1950, 362,070 tons were reported sold by 139 distributors. For 1949, 138 distributors reported sales of 325,873 tons. Again in 1950 actual production figures exceeded expectations of a year ago when 120 plants reported expected sales of 311,052 tons, (average of 2592 tons) when actually 362,070 tons (average of 2605 tons) were sold.

Ice Cubes

Prices on ice cubes are reported by 126 companies compared to 106 last year, a slight increase in number. For commercial use the price range is from a low of 60 cents to a high of $2.50, with an average of $1.21 per 100 lbs. Last year it was from 60 cents to $2.00 with an average of $1.05 per 100 lbs. and an average of $1.26 the year before.

Selling cubes by the bushel continues popular, 35 concerns making such quotations compared to 32 last year. The range is from a low of 60 cents to a high of $1.10 with an average of 85.1 cents per bushel. Last year the range was from 50 cents to $1.25 with an average of 82.4 cents per bushel. Other typical quotations are: 250 cubes for 50 cents; 70 cents per tub; 35 lb. bag for 50 cents; 48 cubes for 25 cents.

For the domestic trade the price range is from a low of 70 cents to a high of $4.00 and an average of $1.70 per 100 lbs. Last year the range was from 70 cents to $3.00, with an average of $1.47 per 100 lbs., and an average of $1.53 the year before.

Here, also, there is no noticeable trend toward accepting 100 lbs. as the unit of sale, thirty of the 301 concerns quote prices per bushel as compared to 28 of 274 concerns last year. The range is from a low of 70 cents to a high of $1.50 with an average of $1.03 per bushel. Last year the range was from a low of 50 cents to a high of $1.50 and an average of $1.02 per bushel and an average the year before of $1.06. Other typical quotations are: 100 cubes for $2.50; 72 cubes for 40 cents; 10 lb. bag for 25 cents; 30 lb. bag $1.00; 200 cubes 60 cents; 48 cubes 25 cents; 35 lb. bag 70 cents.

Fruit and Vegetable Icing

A very slight increase over last year is shown in the number of concerns selling crushed ice for fruit and vegetable icing to retail stores and to gardeners and shippers. Of the 301 concerns, 233 reported such sales, compared with 204 out of 274 concerns last year. The price range to retail stores is from a low of 30 cents to a high of $1.40 and an average of 67.1 cents per 100 lbs. Last year the range was from 30 cents to $1.50 and an average of 65.2 cents and the year before an average of 61.3 cents per 100 lbs. the previous year. Only three prices were quoted per bushel, the average being 45 cents.

For gardeners and shippers the price range is from a low of $3.25 to a high of $16.00 and an average of $9.12 per ton. Last year the range was from $3.25 to $14.00 and an average of $8.06 per ton compared to an average of $7.80 per ton the year before.

Reicing Produce Trucks

Sales of crushed ice for reicing produce trucks are down apparently from last year, 172 distributors reporting quotations as compared to 178 last year and 131 the year before. The price range is from a low of $5.00 to a high of $13.00 and an average of $8.85 per ton. Last year the range was from $4.20 to $12.00 with an average of $7.89 per ton, and an average the year before of $7.79 per ton.

Poultry Icing

For the first time data was collected on sales of ice for poultry icing, which shows that 147 plants, or approximately 48 percent of those reporting expect to sell ice for this purpose during 1951.

Vending Stations

For the second time, information was requested on the number of vending stations in operation during 1950 and the number expected to be in operation in 1951. From 95 distributors reporting, this figure was 264 in 1950 and 290 for 1951. Last year this report from 73 distributors showed 187 in operation during 1949 and 84 distributors expected to have 250 in operation during 1950.

Percentage of Ice Sold

Reports on the percentage of ice sold for different purposes show the following average for 1950 (arithmetical, not weighted) domestic 42 percent; commercial 48 percent; other uses 10 percent. The previous year's report showed: domestic 45.9 percent; commercial 43.2 percent; other uses 10.9 percent.

Canadian Prices

Reports from Canada show the following average prices: domestic 69.6 cents per 100 lbs.; light commercial 48.5 cents per 100 lbs.; heavy commercial $6.62 per ton; dealers $5.50 per ton; car icing $5.50 per ton; carloads $4.50 per ton.

Crushed ice prices for commercial use range from 37½ cents to 40 cents, with an average of 39 cents a bushel; for domestic use from 50 cents to $1.00 with an average of 70 cents a bushel. Cubes commercial range from 60 cents to $1.00 with an average of 77 cents a bushel and for domestic quotations are made in number of cubes, 100 for 50 cents; 75 for 25 cents; 60 for 25 cents. Tonnage sales on crushed ice are much more optimistic than in the States, the expected increase for 1951 running to about 40 percent over 1950 sales.

On vending stations the outlook is very optimistic, the five concerns reporting indicating an increase from four in 1950 to 11 in 1951.

For fruit and vegetable icing the average retail price is quoted at 75 to 80 cents per 100 lbs. and for gardeners and shippers $10.00 a ton.

Ice Prices for 1951

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books / Rate per 100 l's. or % discount	Minimum Delivery, Lbs.	200 Lbs. per delivery to 1500 Lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Retail Produce Trucks	Car Load Lots Mfr'd Ice f. o. b. Plant
ALABAMA																	
Birmingham	.60	.60	Cash disc.	25	.50	10.00	.52	.50	.50	.50	.....	....	6.00	.....	.....	.....	.....
Gadsden	.60	.60	None	25	.60	9.50	.60	.60	.50	.40	7.50	....	6.00	.....	.....	8.00	.....
Greenville	.70	.70	Cash disc.	..	.60	8.00	.80	.70	.70	.60	.....	.....	.....	.....	.....	8.00	.....
Montgomery	.70	.70	No disc.	12½	.60	8.00	.60	.60	.60	.50	8.00	.50	8.00	.....	.....	8.00	.....
Opelika	.60	.70	No disc.	25	.60	9.50	.60	.60	.60	.50	.....	.42	6.00	8.00	.....	8.00	6.00
ARIZONA																	
Clifton	.80	.80	10%	25	.55	7.00	.80	.80	.80	.80	16.00	.80	7.30	.....	.....	.....	.....
Flagstaff	.75	1.00	.....	25	.75	10.00	1.00	.80	.75	.65	10.00	.50	10.00	.....	.....	10.00	.....
Nogales	.70	.70	None	12½	....	6.50	.80	.70	.65	.45	6.50	....	.....	.....	6.50	6.50	5.00
Yuma	.70	.70	5%	25	.60	.....	.60	.60	.60	.50	8.00	.60	.....	.....	.....	7.02	.....
ARKANSAS																	
Harrisburg	.70	.80	Cash disc.	25	.60	10.00	.80	.70	.70	.67	10.00	.67	7.00	.....	.....	10.00	.....
Helena	.70	.70	Cash disc.	25	.60	12.00	.60	.60	.60	.60	10.00	.50	10.00	.....	.....	.....	.....
Jonesboro	.60	.60	5%	25	.60	12.00	.60	.60	.60	.60	10.00	.60	6.00	.....	.....	.....	.....
Lonoke	.60	.60	No disc.	25	.50	5.00	.60	.60	.60	.53	.....	....	6.00	7.50	.....	7.00	5.00
North Little Rock	.60	.60	No disc.	25	.50	10.00	.52	.50	.50	.50	8.00	....	6.00	.....	.....	.....	.....
Paragould	.58	.70	Cash disc.	25	.58	11.00	.60	.60	.55	.50	9.00	.45	6.00	10.00	.....	.....	.....
Texarkana	.70	.70	No disc.	12½	.60	7.00	.60	.60	.60	.50	7.00	.50	7.00	.....	.....	.....	.....
CALIFORNIA																	
Hanford	.70	.70	No disc.	25	.60	8.00	.80	.70	.60	.60	8.00	....	6.00	.....	4.25	8.00	3.50
Hollister	.80	.85	.....	25	....	6.25	1.00	.90	.80	.65	6.50	....	6.15	.....	.....	.....	.....
Holtville	.75	.80	Cash disc.	25	.70	.....	.80	.80	.65	.55	10.00	.65	8.00	.....	.....	11.00	.....
Long Beach	.80	.80	No disc.	25	....	.....	.80	.70	.70	.70	6.25	.90	.....	.....	.....	.....	.....
Los Angeles	.70	.70	None	25	.70	8.00	....	.70	.70	.70	.....	.25	5.00	.....	.....	.....	.....
San Bernardino	.90	.90	No disc.	25	.70	10.00	.80	.80	.80	.80	12.00	.60	7.25	4.50	4.25	6.00	.....
San Jose	.70	.80	5%	25	.60	10.00	.80	.70	.70	.50	.....	....	.....	.....	.....	.....	.....
Santa Monica	.80	.80	No disc.	25	.60	6.00	.80	.80	.80	....	.....	.30	5.50	.....	.....	.....	.....
COLORADO																	
Colorado Springs	.75	.80	No disc.	25	.60	11.00	.80	.70	.65	.55	7.00	.60	7.00	7.50	.....	7.00	.....
Denver	.70	.70	None	25	.60	10.00	.60	.50	.50	.45	8.00	....	5.40	4.90	4.60	7.00	4.80
Durango	1.00	1.20	.....	..	....	15.00	1.20	1.00	.90	.90	12.00	....	10.00	.....	.....	.....	.....
Greeley	.75	.80	5%	25	....	.....	.80	.70	.65	....	6.00	.65	7.00	5.50	5.00	6.00	.....
Longmont	.80	.80	No disc.	25	.80	10.00	1.00	.70	.70	.70	.....	.80	7.00	.....	.....	12.00	.....
Pueblo	.78	.78	Cash disc.	12½	.55	10.00	.80	.70	.55	.50	10.00	....	10.40	.....	.....	.....	.....
Sterling	.80	.80	Cash disc.	25	.70	12.00	.80	.70	.70	.70	10.00	....	8.00	.....	8.00	10.00	.....
CONNECTICUT																	
Bridgeport	.70	.70	None	25	.60	.....	.60	.50	.50	.50	8.00	.40	5.33	.....	.....	8.00	.....
Manchester	.60	.70	.....	25	.60	9.00	.60	.60	.50	.30	.....	....	5.00	.....	.....	.....	.....
Mystic	.70	.70	None	25	.70	.....	.60	.60	.60	.60	6.00	.40	6.00	.....	.....	.....	.....
Norwalk	.70	.75	None	25	.55	9.00	.60	.50	.50	.40	6.00	.25	5.00	.....	.....	8.00	.....
Stamford	.70	.70	.....	25	.50	8.00	.60	.50	.50	.33	.....	.35	5.00	.....	.....	8.00	.....
DELAWARE																	
Dover	.60	.70	None	25	....	10.00	.60	.60	.55	.55	8.00	.55	6.00	.....	.....	8.00	.....
Milford	.55	.66	None	25	.50	8.00	.56	.56	.50	.40	8.00	.40	.....	.....	.....	10.00	.....
Wilmington	.70	.70	.....	25	.60	10.00	.60	.50	.50	.40	8.00	.50	6.00	7.50	7.00	7.33	4.00
DISTRICT OF COLUMBIA																	
Washington	.65	.65	.....	..	.50	8.00	.80	.80	.80	.80	7.00	....	.....	.....	.....	.....	.....
FLORIDA																	
Ft. Myers	.68	.68	None	12½	.56	7.00	.56	.56	.56	.35	6.00	.30	7.00	.....	.....	7.00	.....
Orlando	.70	.70	.....	25	.60	10.00	.60	.60	.60	.50	8.00	.40	.....	.....	.....	8.00	.....
Tampa	.60	.60	None	25	.60	10.00	.52	.50	.50	.50	10.00	.30	6.00	.....	.....	.....	.....
GEORGIA																	
Atlanta	.70	.70	No disc.	25	.55	9.00	.60	.60	.60	.50	8.00	.45	7.00	.....	.....	8.00	6.00
Augusta	.70	.70	No disc.	..	.60	8.00	.60	.60	.60	.60	8.00	.40	9.00	.....	.....	8.00	6.00
Brunswick	.60	.60	No disc.	12½	.60	12.00	.60	.60	.60	.60	8.00	.33	8.00	7.00	5.00	8.00	5.00
Gainesville	.60	.60	.....	25	.45	7.00	.60	.50	.50	.35	8.00	....	.....	7.00	.....	.....	.....
Griffin	.70	.70	No disc.	25	.60	8.00	.80	.70	.70	.60	.....	.50	7.00	.....	.....	9.00	.....
La Grange	.70	.70	No disc.	25	.70	.....	.60	.60	.60	.40	.....	....	7.00	.....	.....	10.00	.....
Thomasville	.60	.60	.....	12½	.50	6.00	.48	.48	.48	.40	6.00	.45	4.50	5.75	5.25	7.00	3.50
IDAHO																	
Boise	.80	.80	Cash disc.	25	.80	10.00	.80	.80	.80	.80	10.00	.50	7.50	.....	4.25	10.00	3.75
Caldwell	1.00	1.00	None	25	.80	5.00	1.00	.80	.80	.60	5.00	....	5.00	.....	.....	7.00	4.00
Idaho Falls	.65	.80	.....	25	.50	6.67	.80	.70	.60	.50	7.00	.60	7.00	5.00	5.00	7.00	5.00
Twin Falls	.65	1.00	None	10c	.70	12.00	....	....	....	....	.....	....	7.00	5.00	.....	.....	.....

Annual Report of Ice Prices—Continued

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books / Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Routes at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots Mf'd Ice f. o. b. Plant
ILLINOIS																	
Belleville	.68	.68	No disc.	25	.58	.....	.60	.60	.60	.60	.....	....	6.00	.....	.....	.....	.....
Bloomington	.70	.70	No disc.	25	.60	12.00	.....	.....	.60	.60	10.00	.30	5.50	6.00	.....	8.00	5.00
Champaign	.60	.60	No disc.	25	.60	12.00	.60	.50	.50	.50	5.50	....	6.00	6.00	5.00	9.00	.....
Clinton	.75	.75	No disc.	25	.60	10.00	.68	.66	.66	.66	10.00	....	5.50	.....	6.50	10.00	.....
Dixon	.70	.70	Cash disc.	25	.60	.....	.60	.60	.60	.60	6.00	....	6.00	7.50	.....	.....	.....
Fairfield	.72	.72	No disc.	25	.56	.....	.64	.64	.64	.64	.....	....	7.00	6.50	.....	10.00	.....
Peoria	.76	.76	No disc.	25	.56	8.60	.60	.60	.60	.60	6.80	.40	6.80	6.50	.....	8.00	.....
Pontiac	.70	.70	Cash disc.	25	.55	6.50	.60	.60	.60	.60	10.00	....	6.50	.....	.....	10.00	.....
Rock Island	.63	.80	.....	25	.63	8.60	.60	.60	.60	.40	5.50	.38	5.50	6.50	.....	.....	.....
Salem	.68	.68	No disc.	25	.58	9.00	.60	.60	.60	.60	.....	....	6.00	.....	7.00	8.00	4.50
Springfield	.70	.70	Cash disc.	25	.65	12.00	.60	.60	.60	.60	9.00	.45	6.40	8.25	6.25	9.00	4.75
INDIANA																	
Gary	.60	.70	Cash disc.	25	.60	9.00	.80	.70	.60	.50	10.00	.45	5.50	9.00	.....	10.00	7.00
Greensburg	.70	.70	Cash disc.	25	.50	9.00	.60	.60	.60	.50	10.00	....	5.00	7.00	6.00	10.00	.....
Hammond	.70	.80	None	25	.60	12.00	.60	.60	.60	.50	10.00	....	5.00	10.00	.....	10.00	.....
Indianapolis	.70	.70	None	25	.65	7.00	.60	.60	.60	.55	7.00	....	7.00	.....	.....	.....	.....
Kokomo	.80	.80	.....	25	.80	14.00	.80	.80	.80	.70	6.50	.80	6.50	.....	.....	.....	.....
Lafayette	.80	.80	Cash disc.	25	.65	11.60	.80	.70	.70	.50	8.00	....	.....	8.00	.....	8.00	.....
New Albany	.60	.60	None	25	.50	5.00	.60	.50	.50	.40	.....	....	6.00	.....	.....	8.00	.....
New Castle	.80	.80	Cash disc.	..	.70	10.00	.70	.70	.70	.50	.....	....	.....	.....	.....	.....	.....
Shelbyville	.70	.70	No disc.	25	.65	7.00	.60	.60	.60	.60	12.00	....	6.00	7.00	7.00	.....	6.00
South Bend	.80	.80	No disc.	25	.70	10.00	.72	.70	.70	.70	12.00	.70	7.00	.....	.....	9.00	5.00
Southeastern	.72	.72	No disc.	25	.60	9.40	.72	.70	.70	.45	9.00	.45	6.00	.....	6.00	9.00	.....
Terre Haute	.00	.60	.....	25	.50	10.00	.60	.60	.60	.50	6.00	.50	6.00	8.00	.....	9.00	.....
IOWA																	
Cedar Rapids	.70	.70	Cash disc.	25	.50	.....	60	.60	.60	.....	.....	....	.....	.....	.....	9.00	.....
Centerville	.70	.70	Cash disc.	..	.50	10.00	.80	.60	.60	.45	7.50	.60	7.50	6.00	5.50	5.00	6.00
Clinton	.75	.75	No disc.	25	.60	11.00	.72	.66	.65	.65	.....	.60	.....	.....	.....	12.00	.....
Fort Madison	.60	.62	None	25	.60	.....	.60	.52	.52	.52	8.00	.60	6.00	.....	3.75	8.00	4.00
Guttenberg	.60	.60	No disc.	..	.40	8.00	.80	.60	.50	.40	8.00	...,	8.00	.....	.....	10.00	.....
Keokuk	.70	.70	Cash disc.	25	.60	10.00	.60	.60	.60	.60	10.00	.60	6.00	6.00	.....	8.00	4.50
Oelwein	.70	.70	70c	25	.60	.....	1.00	.35	.70	.60	9.00	.60	5.50	.....	6.00	6.00	.....
Sioux City	.70	.70	No disc.	25	.40	7.00	.72	.70	.70	.70	14.00	.35	7.00	.....	.....	7.00	.....
Waterloo	.70	.70	Cash disc.	25	.70	12.00	.60	.50	.50	.40	7.00	....	5.00	8.00	5.00	8.00	5.00
KANSAS																	
Atchison	.70	.70	No disc.	25	.60	7.00	.80	.60	.60	.50	10.00	.50	7.00	6.00	.....	10.00	5.50
Junction City	.65	.72	Cash disc.	25	.62	10.00	.60	.60	.60	.50	.....	.65	6.66	8.00	.....	10.00	6.00
Lawrence	.70	.70	No disc.	25	.70	12.00	.80	.70	.70	.60	7.00	.35	6.50	.....	.....	8.00	.....
Manhattan	.60	.60	Cash disc.	25	.50	8.00	.80	.70	.65	.65	7.00	.60	7.00	5.75	5.75	6.00	4.75
Newton	.70	.70	65c	25	.50	8.00	.80	.60	.60	.45	8.00	.50	7.00	.....	5.00	8.00	.....
Pittsburg	.70	.80	No disc.	25	.60	9.50	.60	.60	.60	.45	8.00	....	7.00	7.00	5.00	7.00	.....
Wellington	.70	.70	.....	25	.70	6.00	.60	.60	.60	.50	6.00	....	.....	.....	6.00	6.00	6.00
Wichita	.68	.72	No disc.	12½	.50	9.00	.70	.68	.64	.45	9.00	.45	7.00	6.50	5.00	10.00	5.00
KENTUCKY																	
Danville	.70	.70	No disc.	12	.60	10.00	.60	.60	.60	.50	10.00	....	5.50	.....	10.00	8.00	.....
Frankfort	.50	.60	10%	12	.40	7.00	.60	.50	.40	.35	5.00	.40	5.00	.....	.....	.....	.....
Louisville	.70	.70	None	25	.55	8.00	.80	.70	.70	.62	8.00	.....	8.00	.....	8.00	8.00	.....
Richmond	.80	.80	5c disc.	25	.70	12.00	.80	.70	.70	.50	.....	.70	6.50	.....	.....	10.00	.....
Shelbyville	.50	.60	5%	25	.50	10.00	.60	.50	.50	.42	.....	....	5.00	.....	.....	.....	.....
LOUISIANA																	
Bogalusa	.60	.60	10%	12c	.50	10.00	....	.60	.60	.60	7.40	....	7.40	.....	.....	.....	.....
Houma	.40	.40	.....	..	.40	7.00	.40	.40	.40	.35	5.00	.25	5.00	.....	.....	5.00	5.00
Lafayette	.60	.60	.....	25	.40	8.00	.60	.60	.60	.40	8.00	.40	.....	.....	.....	8.00	.....
Lake Charles	.60	.60	5% disc.	25	.60	10.00	.60	.60	.50	.40	8.00	.40	6.00	6.00	6.00	8.00	.....
Monroe	.70	.70	No disc.	25	.45	7.00	.60	.60	.60	.60	.....	.40	7.00	7.00	.....	7.00	.....
New Orleans	.60	.60	None	25	.60	8.00	.60	.52	.52	.45	7.00	....	5.50	6.40	.....	9.00	5.50
MAINE																	
Bangor	.70	.70	.....	33⅓	.50	7.00	.60	.60	.60	.40	7.00	.35	5.00	6.00	.....	8.00	5.00
Rumford	.60	.60	None	25	.50	5.00	.80	.60	.60	.42	6.00	....	5.00	.....	.....	.....	.....
Waterville	.80	.80	Cash disc.	25	.50	7.00	....	....	....	....	.....	.35	.....	7.00	.....	.....	.....
MARYLAND																	
Baltimore	.70	.70	.....	25	.60	8.00	.60	.60	.60	.50	.....	.40	6.00	.....	.....	8.00	.....
Easton	.65	.70	.....	25	.50	7.00	.60	.60	.60	.50	7.00	.50	4.00	5.00	.....	7.00	4.00
Frederick	.60	.60	No disc.	12½	.60	11.00	.60	.60	.55	.40	8.00	.35	4.50	.....	.....	8.00	.....
Frostburg	.50	.50	.....	50	.40	5.25	.60	.50	.50	.50	5.25	.40	5.25	.....	.....	5.25	.....
Salisbury	.70	.70	None	25	.60	10.00	.60	.60	.60	.50	8.00	.50	6.00	.....	.....	7.33	5.00

Annual Report of Ice Prices—Continued

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books: Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots M/4 Ice f. o. b. Plant
MASSACHUSETTS																	
Attleboro	.70	.70	.....	..	.60	.....	.52	.50	.50	.30	6.00	....	5.00	.....	.....	.....	.....
Greenfield	.70	.70	No disc.	25	.70	.....	.50	.50	.50	.40	8.00	.70	4.67	.....	.....	8.00	.....
Holyoke	.70	.70	.....	20	.60	8.00	.60	.50	.50	.40	.....	.40	5.00	8.00	.....	8.00	.....
Leominster	.70	.70	.....	50	.40	7.00	.60	.60	.60	.35	5.75	....	5.75	.....	.....	.....	.....
Lowell	.70	1.20	.....	30	.50	6.00	1.00	1.00	.50	.25	4.50	.25	5.00	.....	.....	7.00	.....
Medford	.75	.80	.....	25	.50	8.00	....	....	.50	....	....	....	5.00	.....	.....	.....	.....
Middleboro	.60	.70	.....	25	.60	8.00	.60	.60	.60	.60	7.00	....	.....	.....	.....	.....	.....
South Harwich	.80	.90	None	25	.70	8.65	.80	.70	.70	.70	.....	.50	7.00	.....	.....	.....	.....
Springfield	.70	.70	.....	25	.60	6.00	....	....	.50	....	5.00	....	5.00	7.00	.....	.....	.....
Worcester	.70	.70	None	25	.60	4.50	.60	.50	.50	.25	5.00	.40	5.00	7.00	.....	.....	.....
MICHIGAN																	
Benton Harbor	.80	.80	None	25	.70	12.00	.80	.70	.70	.55	9.00	.75	6.05	6.95	.....	9.00	.....
Coldwater	.60	.60	No disc.	25	.50	8.00	.60	.60	.60	.50	6.00	.50	5.00	.....	.....	8.00	.....
Detroit	.80	.80	No disc.	25	.70	13.00	.80	.80	.65	.50	8.00	.40	7.40	10.00	.....	10.00	.....
Flint	.80	.80	None	25	.70	8.50	.80	.80	.80	.80	10.00	....	8.00	.....	.....	.....	.....
Jackson	.80	.80	No disc.	25	.70	10.00	.76	.70	.70	.50	9.00	.60	.....	11.00	.....	10.00	.....
Lansing	.70	.70	No disc.	25	.65	10.00	.60	.60	.60	.50	8.60	....	8.00	9.00	.....	8.00	.....
Muskegon Heights	.80	.80	No disc.	25	.70	.....	.72	.70	.70	.70	8.00	....	.....	.....	.....	.....	.....
Royal Oak	.80	.80	No disc.	25	.65	.....	.80	.80	.80	....	.....	....	.....	.....	.....	.....	.....
South Haven	.80	.80	No disc.	25	.80	14.00	.80	.80	.80	.60	.....	.50	6.50	7.50	.....	9.00	.....
Traverse City	....	....	.....	..	....	.....	.60	.60	.60	....	12.00	.50	6.00	.....	10.00	10.00	.....
MINNESOTA																	
Albert Lea	.65	.80	Cash disc.	25	.50	10.00	1.00	.70	.65	.50	12.50	.65	.....	.....	8.00	10.00	.....
Brainerd	.60	.80	None	25	.50	8.00	.60	.50	.40	.40	5.00	....	....	....	....	....	....
Minneapolis	.70	.70	No disc.	25	.60	10.00	.60	.60	.60	.60	6.00	.30	5.15	5.00	5.00	6.00	4.00
New Ulm	.75	1.00	.....	35	.75	.....	1.20	1.00	....	....	....	....	....	....	....	....	....
Rochester	.75	.80	Cash disc.	25	.80	14.00	.60	.50	.50	.30	8.00	.40	5.00	8.50	6.00	10.00	4.50
St Paul	.70	.70	No disc.	25	.60	11.00	.72	.70	.70	.67	.....	.30	5.00	.....	.....	.....	.....
MISSISSIPPI																	
Columbus	.60	.60	10%	25	.54	10.80	.50	.50	.50	....	.....	.30	6.00	6.00	.....	6.00	.....
Eupora	.60	.60	No disc.	25	.50	10.00	.60	.60	.60	....	.....	....	7.00	.....	.....	6.00	.....
Hollandale	.70	.70	No disc.	25	....	.....	.80	.70	.70	.50	.....	.50	7.00	.....	.....	.....	.....
Jackson	.70	.70	Cash disc.	12½	.50	9.00	.60	.60	.60	.60	10.00	.45	6.00	7.00	.....	7.00	.....
MISSOURI																	
Carthage	.50	.60	No disc.	25	.50	10.00	.60	.60	.50	.35	7.00	.35	5.50	5.50	5.50	7.00	5.00
Columbia	.65	.65	Cash disc.	25	.55	9.00	.60	.60	.50	.50	.....	.30	7.20	.....	.....	.....	.....
Fayette	.60	.70	Cash disc.	25	.60	.....	.80	.60	.50	.40	.....	....	5.40	.....	.....	.....	.....
Joplin	.70	.70	No disc.	25	.60	12.00	.80	.70	.70	.40	7.00	....	7.00	.....	.....	.....	.....
Kansas City	.55	.70	No disc.	25	.55	11.00	.60	.60	.60	.50	10.00	.55	7.00	6.00	.....	7.00	4.75
Marshall	.70	.80	Cash disc.	25	.50	9.00	.80	.60	.60	.45	6.50	.60	6.50	5.00	.....	6.00	.....
Poplar Bluff	.64	.64	Cash disc.	25	.54	8.80	.56	.56	.50	.44	8.80	.40	5.66	7.00	.....	8.00	.....
St. Louis	.80	.80	No disc.	25	.60	10.00	.80	.80	.80	.60	7.00	.60	7.00	.....	.....	.....	4.50
Southeastern	‡.66	.76	No disc.	25	.66	.....	.60	.60	.60	.56	8.40	....	5.66	.....	.....	8.40	5.00
MONTANA																	
Butte	.80	1.00	Cash disc.	25	.60	8.00	.80	.60	.60	.60	7.00	....	4.50	8.00	8.00	8.00	6.00
Helena	.80	.80	No disc.	25	.70	12.00	.80	.80	.80	.70	12.00	....	.....	.....	.....	12.00	.....
NEBRASKA																	
Falls City	.70	.70	Cash disc.	25	....	.....	.60	.60	.50	.42	.....	.45	6.75	.....	.....	.....	.....
Lincoln	.60	.60	No disc.	25	.60	12.00	.60	.50	.50	.30	7.00	.35	6.00	.....	.....	8.00	4.00
North Platte	.80	.80	5%	25	.60	10.00	.72	.70	.70	.55	8.00	....	7.50	.....	.....	10.00	.....
Omaha	.70	.70	No disc.	25	.60	10.00	1.00	.60	.60	.50	5.50	.60	5.50	6.50	.....	9.00	4.50
NEVADA																	
Boulder City	1.20	1.40	.....	25	1.20	.....	1.20	1.20	1.20	1.20	.....	....	.....	.....	.....	.....	.....
NEW HAMPSHIRE																	
Bristol	.65	.65	.....	15c	.60	.....	....	....	.55	....	5.00	....	.....	.....	.....	.....	.....
Derry	.90	.90	None	..	....	.....	....	....	.90	....	....	....	....	....	....	....	....
Manchester	.60	.70	Cash disc.	20c	.50	8.00	.60	.50	.40	.30	6.00	.35	5.50	7.00	.....	.....	.....
Nashua	.60	.60	None	35	.45	7.50	.60	.50	.50	.50	8.00	.35	4.00	10.00	.....	.....	.....
NEW JERSEY																	
Asbury Park	.80	.80	Cash disc.	25	.70	12.00	....	....	....	....	.....	....	....	....	....	.....	.....
Glassboro	....	....	.....	..	....	.....	.80	.70	.65	.38	.....	.45	5.33	5.50	5.50	6.33	.....
Hackettstown	.50	.60	None	30	.50	7.00	.60	.50	.50	.33	7.00	.40	4.55	8.75	7.00	7.00	5.25
Mt. Holly	.70	.70	.....	25	.50	10.00	.60	.60	.60	.33	7.00	.60	4.67	.....	.....	7.35	.....
NEW MEXICO																	
Albuquerque	.70	.80	Cash disc.	12½	.50	9.00	.60	.60	.60	.50	10.00	.50	8.00	.....	.....	10.00	.....
Gallup	1.00	1.00	10%	50	.90	15.00	....	....	1.00	....	15.00	....	15.00	.....	15.00	.....	.....
Tucumcari	.80	1.00	None	25	.70	12.00	.80	.70	.70	.60	10.00	.80	10.00	5.00	5.50	10.00	5.00

Annual Report of Ice Prices—Continued

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots Mf'd Ice f. o. b. Plant
NEW YORK																	
Auburn	1.00	1.00	No disc.	25	.80	14.00	.80	.80	.80	.80	9.00	.70	7.00	.....	8.00	8.00	.....
Binghampton	.80	.80	Cash disc.	25	.60	8.00	.60	.50	.50	.40	4.75	....	5.00	.....	.....	8.00	.....
Lackawanna	.80	.80	None	25	.70	12.00	.80	.80	.80	.40	8.00	....	6.00	.....	.....	.....	.....
New York	.60	.60	None	15	.50	8.00	....	....	....	....	.....	.40	3.65	6.00	.....	.....	.....
Rochester	.80	.80	Cash disc.	25	.60	11.00	.80	.70	.70	.60	.....	....	6.33	12.00	.....	8.00	.....
Troy	.70	.80	None	25	.50	7.00	.60	.60	.60	.60	.40	.40	.....	.....	.....	.....	.....
Syracuse	.70	.80	Cash disc.	..	.50	.....	.60	.60	.60	.50	8.00	....	7.00	7.00	.....	7.00	.....
Watertown	.70	.70	None	25	.57	11.00	.80	.70	.60	.45	8.00	....	6.00	.....	.....	.....	.....
NORTH CAROLINA																	
Asheville	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.50	10.00	....	7.00	8.00	5.52	11.00	4.50
Charlotte	.70	.70	No disc.	25	.70	11.00	.80	.70	.60	.50	8.00	.40	8.00	7.00	.....	8.00	.....
Goldsboro	.70	.70	No disc.	12½	.60	8.00	.60	.60	.60	.45	.....	....	6.00	10.00	.....	8.00	.....
Henderson	.70	.70	No disc.	25	.60	8.00	.80	.70	.70	.60	.....	.40	.....	.....	.....	8.00	.....
High Point	.70	.70	No disc.	25	.70	10.00	....	....	.30	....	.....	....	.....	.....	.....	.....	.....
NORTH DAKOTA																	
Dickinson	.90	1.00	Cash disc.	15	.90	.....	1.00	1.00	.90	.90	.....	....	.....	.....	.....	.....	.....
Fargo	.50	.70	.....	25	.50	5.00	....	....	.50	....	5.00	....	.....	5.00	.....	.....	.....
Minot	.50	.60	.....	40	.50	6.00	.60	.50	.50	.50	7.00	....	5.00	4.00	.....	8.00	.....
OHIO																	
Ashland	.60	.75	Cash disc.	25	.60	.....	80	.60	.60	.42	7.00	....	.....	.....	.....	12.00	.....
Cambridge	.60	.60	No disc.	25	.50	10.00	.60	.50	.50	.50	.....	....	7.00	.....	.....	7.00	.....
Dayton	.70	.70	None	25	.70	12.00	.80	.60	.60	.44	.....	.98	6.50	.....	.....	.....	.....
Hamilton	.80	.80	None	25	.70	10.00	.72	.70	.70	.60	10.00	.70	7.67	.....	.....	10.00	.....
Lima	.70	.70	No disc.	25	.55	9.00	.60	.60	.60	.60	7.00	.35	5.50	6.60	8.00	8.00	.....
Mansfield	.80	.80	Cash disc.	25	.60	9.00	.80	.70	.70	.60	10.00	.45	.....	10.00	.....	.....	.....
Middletown	.80	.80	No disc.	25	.60	12.00	.72	.70	.70	.50	10.00	.60	6.00	.....	.....	.....	.....
Springfield	.75	.80	Cash disc.	25	.65	.....	.80	.70	.65	.65	11.00	....	6.50	9.00	.....	.....	.....
Troy	.80	.80	No disc.	25	.70	12.00	.72	.70	.70	.50	10.00	.70	7.00	.....	.....	.....	.....
Warren	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.60	10.00	.60	8.00	12.00	.....	12.00	.....
OKLAHOMA																	
Bartlesville	.80	.80	No disc.	25	.65	10.00	70	.70	.70	.50	8.00	....	7.00	.....	.....	.....	.....
Claremore	.70	.70	No disc.	..	.60	12.00	.60	.60	.60	.60	9.00	.45	6.00	6.00	8.00	8.00	.....
Enid	.90	.90	No disc.	25	.60	10.00	.80	.80	.80	.50	.....	....	7.50	7.50	6.50	9.00	5.00
Oklahoma City	.70	.70	No disc.	12½	.60	12.00	.80	.70	.60	.50	8.00	....	7.00	.....	.....	.....	.....
Perry	.80	.80	No disc.	25	.70	.....	.72	.70	.70	.50	.....	....	8.00	.....	.....	10.00	.....
Ponca City	.80	.80	None	25	.60	12.00	.80	.80	.80	.60	8.00	.35	9.00	8.00	8.00	12.00	.....
Purcell	.80	.80	No disc.	25	.70	.....	.80	.70	.70	.60	8.00	....	8.00	.....	.....	10.00	.....
Shawnee	.60	.70	None	12½	.55	11.00	.60	.50	.50	.45	6.00	.35	7.00	7.00	7.00	9.00	.....
Tulsa	.70	.70	No disc.	..	.60	12.00	....	....	.60	....	.....	....	7.00	.....	.....	.....	.....
OREGON																	
Klamath Falls	.80	1.00	5%	25	.90	10.00	.80	.80	.75	.75	8.00	.50	8.00	8.00	5.00	8.00	4.00
Portland	.90	1.00	10%	25	.75	10.50	1.00	1.00	.90	.52	7.00	.60	5.00	6.50	6.50	10.00	5.00
PENNSYLVANIA																	
Beaver Falls	.70	.75	.....	25	.70	8.00	....	....	....	....	.....	....	.....	12.00	.....	.....	.....
Berwick	.60	.60	.....	..	.50	.....	.60	.60	.50	.42	.....	....	.....	.....	.....	8.40	.....
Butler	.80	.80	None	25	.50	8.00	80	.60	.60	.50	8.00	.40	6.00	.....	.....	.....	.....
Coatesville	.70	.70	None	25	.60	10.00	1.20	1.00	.70	.40	8.00	.40	6.00	.....	.....	8.00	.....
Harrisburg	.60	.60	.....	25	.50	.....	.60	.50	.50	.50	.....	....	5.25	.....	.....	.....	.....
Lancaster	.60	.60	None	25	.45	5.75	80	.60	.60	.40	6.50	.50	6.00	8.00	6.50	6.50	6.00
Lansdale	.75	.80	.....	25	.70	12.00	80	.70	.70	.50	10.00	.70	5.50	.....	.....	.....	.....
Meadville	.80	.80	None	25	.80	.....	80	.80	.80	.60	7.00	....	6.67	7.00	.....	.....	.....
New Castle	.80	.80	5%	25	.60	6.00	80	.70	.70	.40	.....	....	.....	.....	.....	.....	.....
Philadelphia	.70	.70	.....	..	.55	9.00	....	....	.50	....	.....	....	5.06	.....	.....	.....	.....
Reading	.65	.65	None	25	.55	.....	.60	.50	....	.33	.....	.30	6.00	6.65	6.00	.....	.....
York	.70	.80	.....	..	.60	10.00	.60	.60	.60	.40	8.00	....	5.60	.....	.....	8.00	.....
RHODE ISLAND																	
Bristol	.80	.80	.....	25c	.60	8.00	....	....	.50	.50	10.00	.....	4.60	.....	.....	.....	.....
Pawtucket	.70	.70	.....	25	.50	10.00	.60	.60	.60	.50	4.00	.25	4.00	.....	.....	.....	.....
SOUTH CAROLINA																	
Anderson	.70	.70	No disc.	50	.70	14.00	80	70	.70	.70	14.00	....	.....	.....	.....	.....	.....
Camden	.50	.60	.....	..	.50	.....	.65	.60	.50	40	.....	.40	6.67	.....	.....	.....	.....
Greenville	.70	.70	.....	..	.50	.....	80	.60	.60	.45	9.00	....	6.67	6.67	5.50	9.00	5.00
Hampton	.70	.70	No disc.	50	.60	12.00	80	.70	.70	.60	10.50	....	8.40	.....	.....	.....	.....
Newberry	.70	.70	None	12½	.70	.....	80	.70	.70	.60	12.00	....	.....	.....	.....	.....	.....
Seneca	.70	.70	60c	25	.60	.....	80	.60	.60	.45	.....	.60	6.00	.....	.....	.....	.....
Sumpter	.70	.70	10%	25	.63	.....	80	.70	.70	.70	.....	.46	9.40	10.00	7.00	8.50	6.00

Annual Report of Ice Prices—Concluded

CITIES	Domestic Trade per 100 lbs. Delivered				Commercial Trade Delivered		Cash Sales at Sales Stations and Platform, per 100 lbs.					Wholesale Trade per 100 lbs. and per ton					
	Over 100 lbs.	Under 100 lbs.	Coupon Books — Rate per 100 lbs. or % discount	Minimum Delivery, lbs.	200 lbs. per delivery to 1500 lbs. per week per 100 lbs.	1500 lbs. per week to Truck lots per ton	25 Pounds	50 Pounds	100 Pounds	300 Pounds	Ton Lots	Ice Cream Mfrs., Fish Dealers, etc.	Peddlers and Dealers at Platform	Icing Cars in R. R. Yards	Icing Cars at Plant	Reicing Produce Trucks	Car Load Lots Mf'd Ice f. o. b. Plant
SOUTH DAKOTA																	
Aberdeen	.90	.90	No disc.	25c	.70	12.00	.60	.60	.60	.60	10.00	....	.....	.....	.....	.....	5.00
Huron	1.00	1.00	No disc.	25	.75	8.00	1.00	1.00	1.00	.75	8.00	....	.....	.....	.....	.....	.....
Rapid City	.70	.80	No disc.	25	.60	8.00	.80	.70	.70	.50	7.00	.60	6.50	7.50	.....	6.00	6.00
TENNESSEE																	
Cleveland	.70	.70	Net	12½	.70	14.00	.80	.70	.70	.60	8.00	....	7.50	.....	.....	10.00	.....
Jackson	.60	.60	.....	12½	.46	8.00	....	....	.60	....	.....	....	.....	.....	.....	.....	.....
Knoxville	.70	.70	.....	25	.60	12.00	.60	.60	.60	.50	10.00	.60	7.00	.....	.....	10.00	.....
Mt. Pleasant	.70	.70	5%	25	.70	8.00	.80	.70	.70	.50	8.00	....	.....	.....	.....	.....	.....
TEXAS																	
Brady	.70	.80	No disc.	25	.70	10.00	.60	.50	.50	.35	7.00	....	7.00	7.00	7.00	7.00	.....
Brownwood	.60	.70	.....	25	.50	6.00	.60	.60	.60	.60	7.00	....	6.67	7.00	6.00	7.00	5.00
Dallas	.70	.70	No disc.	25	.60	9.00	.60	.60	.60	.60	10.00	.50	6.50	7.00	.....	7.00	6.00
Denton	.70	.70	No disc.	25	.60	12.00	.80	.70	.70	.60	12.00	.35	7.00	.....	.....	12.00	8.00
Ft. Worth	.70	.70	No disc.	25	.60	12.00	.60	.60	.60	.60	10.00	.60	6.00	.....	.....	7.40	.....
Graham	.60	.60	No disc.	25	.60	.....	.60	.60	.55	.43	.....	.60	6.66	6.00	6.00	6.00	.....
Longview	.50	.50	No disc.	12½	.50	6.00	.52	.50	.50	.50	8.00	.40	5.50	.....	.....	8.00	4.00
Marshall	.60	.60	No disc.	12½	.50	6.00	.60	.50	.50	.50	7.00	.35	6.00	7.00	7.00	7.00	3.00
Overton	.60	.60	No disc.	25	.60	.....	.60	.60	.60	.60	.....	....	6.00	.....	.....	.....	.....
Plainview	.70	.80	.....	25	.60	.....	.80	.70	.70	.37	7.20	....	7.70	7.70	.....	8.00	.....
UTAH																	
Ogden	.70	.80	No disc.	25	.40	8.00	.60	.50	.40	.35	5.00	....	5.00	.....	.....	5.00	4.50
Park City	.75	.75	.....	..	....	.....	1.00	1.00	.75	.75	.....	....	.....	.....	.....	.....	.....
Salt Lake City	.75	.80	No disc.	25	.60	8.00	.80	.70	.65	.40	5.00	.40	5.00	.....	.....	.....	4.50
VERMONT																	
Brattleboro	.80	.80	Cash disc.	25	.70	8.50	.80	.70	.70	.65	8.00	....	7.00	.....	.....	.....	.....
Central Vt.	.70	.70	.....	25	.50	.....	.80	.80	.70	1.00	5.00	....	5.00	.....	.....	.....	.....
VIRGINIA																	
Alexandria	.70	.70	Cash disc.	25	.70	14.00	.68	.68	.60	.45	8.00	....	6.00	.....	.....	6.00	.....
Charlottesville	.70	.80	10%	10	.45	8.00	.80	.60	.50	.40	8.00	.45	6.00	7.00	.....	8.00	7.00
Danville	.80	.80	No disc.	25	.65	.....	.80	.80	.80	.80	.....	.80	.....	6.50	.....	13.00	.....
Farmville	.70	.70	Net	12½	.70	.....	.80	.70	.70	.70	.....	....	7.33	.....	.....	8.00	.....
Fredericksburg	.70	.80	No disc.	..	.70	.....	.72	.70	.65	.50	7.00	....	5.95	.....	.....	7.00	.....
Winchester	.60	.60	10%	25	.50	8.00	.60	.60	.50	.45	7.00	.35	5.50	7.00	4.75	6.00	4.00
Yorktown	.60	.60	No disc.	25	.50	.....	.60	.60	.60	.50	.....	....	.....	.....	.....	.....	.....
WASHINGTON																	
Aberdeen	.85	1.00	Cash disc.	25	.85	14.00	....	....	.70	....	.....	....	6.50	6.00	.....	.....	.....
Everett	.80	.90	Cash disc.	25	.80	.....	1.00	.90	.80	.62	6.00	....	6.00	6.50	6.00	.....	6.00
Tacoma	.70	.80	5%	25	.55	10.00	.80	.70	.70	.45	6.00	.55	5.00	6.00	5.50	.....	4.50
Vancouver	.80	.80	Cash disc.	25	.80	.....	.80	.70	.70	.42	.....	....	.....	.....	.....	.....	.....
Yakima	.80	.80	No disc.	25	.70	7.00	.60	.60	.60	.60	6.50	.35	5.50	7.00	5.15	7.50	5.00
WEST VIRGINIA																	
Bluefield	.70	.70	Net	25	.60	10.00	.60	.60	.60	.50	8.40	.40	7.00	.....	.....	8.00	6.00
Charleston	.70	.70	Net	25	.60	10.00	.60	.60	.60	.50	10.00	.50	6.66	9.00	.....	10.00	7.00
Huntington	.65	.70	5%	12½	.55	9.00	.60	.60	.50	.45	.....	....	6.00	9.00	.....	.....	5.00
Montgomery	....	....	.....	..	.60	7.50	.80	.80	.80	.80	.....	....	7.33	.....	.....	.....	6.00
Ransom	.60	.60	No disc.	10	.50	7.00	.56	.56	.55	.45	7.00	....	4.50	.....	5.00	7.00	5.00
Williamson	.80	.80	No disc.	25	.60	8.00	.80	.70	.70	.70	.....	....	8.00	.....	.....	.....	7.00
WISCONSIN																	
Appleton	.50	.60	No disc.	25	.45	.....	.60	.50	.40	....	.....	....	4.00	5.00	.....	.....	.....
Ashland	.50	.50	No disc.	50	.45	7.00	.80	.50	.40	.40	6.00	.45	6.00	6.25	.....	6.00	5.00
Fond du Lac	.60	.60	No disc.	25	....	.....	.52	.50	.50	.50	10.00	.40	4.00	.....	4.25	.....	.....
Madison	.70	.70	Cash disc.	25	.55	9.00	.60	.60	.60	.60	12.00	.50	5.00	8.00	5.00	10.00	7.50
Manasha	.70	.80	Net	25	.60	10.00	.60	.60	.60	.60	10.00	.50	.....	.....	.....	.....	.....
Milwaukee	.80	.80	None	25	.70	12.00	.60	.60	.60	.60	8.00	....	6.00	6.00	.....	10.00	5.00
Sheboygan	.80	1.00	No disc.	25	.72	12.00	.80	.60	.60	.60	12.00	.65	8.80	12.00	.....	12.00	.....
Superior	.80	.80	No disc.	25	.75	10.00	.80	.70	.70	.53	8.00	.40	7.00	8.00	8.00	8.00	8.00
Waukesha	.80	.80	No disc.	25	....	8.00	....	....	....	....	.....	....	.....	.....	.....	.....	.....
Wausau	.60	.60	Cash disc.	25	.40	5.00	.60	.50	.50	.50	5.00	.40	.....	12.00	.....	10.00	.....
WYOMING																	
Casper	.60	.80	No disc.	25	.50	8.00	.80	.70	.60	.50	8.00	....	8.00	6.00	.....	6.00	3.00
Cheyenne	.80	.80	Cash disc.	25	.60	12.00	1.00	.80	.80	.50	8.00	....	7.00	5.00	7.00	10.00	5.50
Laramie	1.00	1.00	No disc.	25	.70	10.00	.80	.80	.80	.70	10.00	....	.....	5.00	.....	10.00	.....
Sheridan	.85	.90	Cash disc.	25	.65	.....	.80	.70	.60	.45	6.00	.60	6.00	7.50	7.50	.....	.....
CANADA																	
Montreal	.60	.60	No disc.	25	.40	6.00	.40	.40	.40	.40	5.00	.40	.....	6.00	.....	.....	.....
Ottawa	.55	.64	.....	25	.44	5.50	.60	.60	.60	....	.....	.34	5.50	.....	.....	.....	.....
Toronto	.64	.64	No disc.	25	.50	7.00	.60	.60	.60	.50	9.00	.50	5.50	5.50	5.00	6.50	4.00
Vancouver	.90	1.00	No disc.	50	.60	8.00	.80	.60	.60	.35	7.00	.35	.....	5.50	.....	.....	5.00

Table I shows the average price of ice per 100 lbs. and per ton in each state in the four divisions into which the country has been divided.

TABLE I—AVERAGE PRICE OF ICE PER 100 LBS. AND PER TON IN STATES BY GROUPS, 1951

State	Dom. Trade 100 lbs.	Light Commercial 100 lbs.	Heavy Commercial Per Ton	Dealers Per Ton	Car Icing Per Ton	Carload Per Ton
EASTERN STATES—73 REPORTS						
Connecticut	69.5c	59.0c	$8.67	$5.27		
Delaware	65.2c	55.0c	9.33	6.00	$7.25	$4.00
D. C.	65.0c	50.0c	8.00			
Maine	70.0c	50.0c	6.33	5.00	6.50	5.00
Maryland	63.5c	54.0c	8.25	5.15	5.00	4.50
Massachusetts	74.2c	58.0c	7.02	5.27	7.33	
New Hampshire	71.7c	52.5c	7.75	4.75	8.50	
New Jersey	68.3c	56.7c	9.67	4.88	6.69	5.25
New York	77.0c	59.6c	10.14	5.85	8.25	
Pennsylvania	71.0c	58.7c	8.67	5.77	7.69	6.00
Rhode Island	75.0c	55.0c	9.00	4.30		
Vermont	75.0c	60.0c	8.50	6.00		
Virginia	68.8c	60.0c	10.00	6.16	6.31	5.50
West Virginia	69.5c	57.5c	8.58	6.58	7.67	6.00
AVERAGE PRICE	70.3c	56.1c	8.56	5.45	7.12	5.18
SOUTHERN STATES—68 REPORTS						
Alabama	65.0c	58.0c	$9.00	$6.50	$8.00	$6.00
Arkansas	65.6c	56.3c	9.57	6.86	8.75	5.00
Florida	66.0c	58.7c	9.00	6.50		
Georgia	65.7c	57.1c	8.33	7.08	6.00	5.12
Louisiana	58.3c	49.2c	8.33	6.18	6.35	5.25
Mississippi	65.0c	51.3c	9.93	6.50	6.50	
North Carolina	70.0c	64.0c	9.80	7.00	7.63	4.50
Oklahoma	76.2c	62.2c	11.66	7.37	7.25	5.00
South Carolina	67.9c	60.4c	13.00	7.43	7.29	5.50
Tennessee	67.5c	61.5c	10.50	7.25		
Texas	66.4c	59.1c	8.71	6.55	6.77	5.40
AVERAGE PRICE	66.7c	58.0c	9.80	6.84	7.17	5.22
MIDWESTERN STATES—90 REPORTS						
Illinois	70.0c	59.2c	$9.84	$6.12	$6.55	$4.78
Indiana	71.8c	62.0c	9.50	6.00	7.55	6.00
Iowa	68.4c	54.5c	9.67	6.43	5.75	4.88
Kansas	69.2c	59.0c	8.69	6.88	6.00	5.45
Kentucky	66.0c	55.0c	9.40	6.00	9.00	
Michigan	76.9c	67.7c	10.78	6.70	9.07	
Minnesota	74.6c	62.5c	10.60	5.03	6.50	4.25
Missouri	67.5c	56.7c	9.97	6.32	5.80	4.81
Ohio	73.5c	62.0c	10.75	6.77	9.12	
Wisconsin	70.0c	57.7c	9.12	5.83	7.45	6.37
AVERAGE PRICE	70.8c	59.6c	9.83	6.21	7.28	5.22
WESTERN STATES—53 REPORTS						
Arizona	76.9c	63.3c	$7.83	$8.65	$6.50	$5.00
California	78.1c	65.0c	8.03	6.32	4.33	3.50
Colorado	81.9c	65.0c	11.33	7.83	5.92	4.50
Idaho	83.7c	70.0c	8.42	6.62	4.81	4.25
Montana	85.0c	65.0c	10.00	4.50	8.00	6.00
Nebraska	70.0c	60.0c	10.66	6.44	6.50	4.25
Nevada	130.0c	120.0c				
New Mexico	88.3c	70.0c	11.00	10.00	8.00	5.00
North Dakota	70.0c	63.3c	5.50	5.00	4.50	
Oregon	92.5c	82.5c	10.25	7.50	6.50	4.50
South Dakota	88.3c	68.3c	9.33	6.50	7.50	5.50
Utah	75.8c	50.0c	8.00	5.00		4.50
Washington	82.5c	74.0c	10.33	5.75	6.02	5.17
Wyoming	84.4c	61.2c	10.00	7.00	6.40	4.25
AVERAGE PRICE	84.8c	69.8c	9.28	6.66	6.25	4.70

Table II presents summaries of the prices that have been compiled in Table I for ice sold at retail, for the domestic, the light commercial and the heavy commercial trade.

TABLE II—SUMMARY OF ICE PRICES PER HUNDRED POUNDS AND PER TON—1951

Section	Domestic Trade 100 lbs.	Light Commercial 100 lbs.	Heavy Commercial per ton
Eastern States	70.3c	56.1c	$8.56
Southern States	66.7c	58.0c	9.80
Midwestern States	70.8c	59.6c	9.83
Western States	84.8c	69.8c	9.28
GENERAL AVERAGE	73.2c	60.8c	9.37

Table III presents summaries of the prices compiled in Table I for wholesale ice representing sales to dealers, car icing, and carloads.

TABLE III—AVERAGE PRICE PER TON FOR DEALERS CAR ICING, CARLOADS

Section	Dealer Sales Per Ton	Car Icing Per Ton	Carload Sales Per Ton
Eastern States	$5.45	$7.12	$5.18
Southern States	6.84	7.17	5.22
Midwestern States	6.21	7.28	5.22
Western States	6.66	6.25	4.70
GENERAL AVERAGE	6.29	6.96	5.08

Table IV shows the average prices charged for the different classes of trade during the last seven years. These prices are illustrated in graphic form in the chart reproduced in the first part of this article.

TABLE IV—AVERAGE PRICES CHARGED FOR ICE, VARIOUS CLASSES OF TRADE, 1945–1951

	1945	1946	1947	1948	1949	1950	1951
Domestic	58.9c	59.4c	64.5c	67.2c	68.5c	69.4c	73.2c
Commercial	42.4c	41.5c	47.0c	50.6c	51.3c	51.2c	53.8c
Dealers	$5.56	$5.72	$6.13	$6.04	$6.41	$6.14	$6.29
Car Icing	5.17	5.45	5.77	6.68	6.73	6.76	6.96
Carloads	4.28	4.61	4.70	4.92	5.17	5.00	5.08

Table V gives the average price for domestic trade in different sections of the country also the grand average for the years 1941-1951 inclusive.

TABLE V—AVERAGE PRICES FOR DOMESTIC TRADE IN DIFFERENT SECTIONS—1941–1951

Year	Eastern	Southern	Midwestern	Western	Average
1941	53.1c	45.6c	50.9c	65.0c	53.6c
1942	55.9c	50.6c	53.9c	66.5c	56.7c
1943	57.2c	52.3c	55.0c	66.0c	57.6c
1944	58.5c	52.4c	55.8c	63.8c	57.6c
1945	57.5c	52.1c	56.1c	69.7c	58.8c
1946	59.4c	52.2c	56.5c	69.4c	59.4c
1947	63.3c	59.3c	60.8c	74.5c	64.5c
1948	66.9c	60.3c	65.0c	76.6c	67.2c
1949	67.2c	62.2c	66.7c	77.8c	68.5c
1950	69.4c	62.2c	66.4c	79.8c	69.5c
1951	70.3c	66.7c	70.8c	84.8c	73.2c

Table VI shows the average price received for domestic ice, wholesale ice, and all ice sold. The grand average for all ice as shown in this table is $9.08 per ton, compared to $8.71 per ton last year and $8.73 the year before.

TABLE VI—AVERAGE PRICE OF ICE—1951

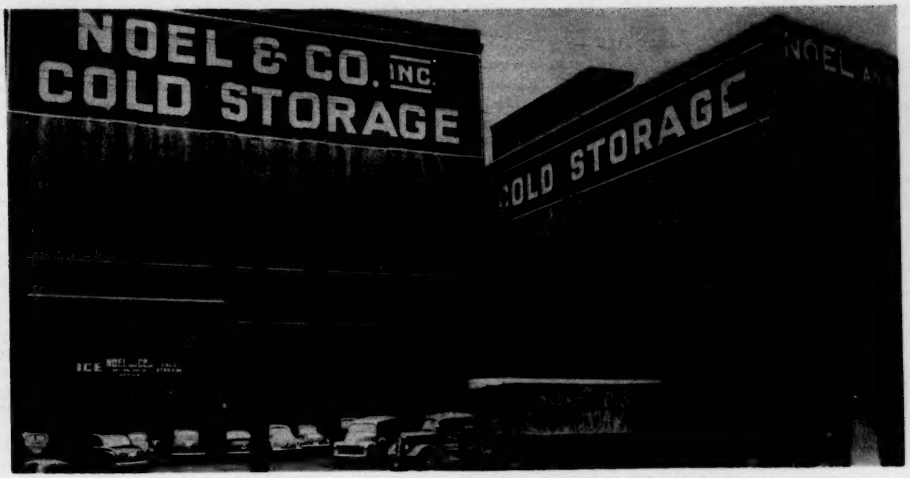
	Per Cwt.	Per Ton
AVERAGE PRICE FOR DELIVERED ICE—1951		
Domestic Trade	73.2c	$14.64
Light Commercial Trade	60.8c	12.16
Heavy Commercial Trade	46.8c	9.37
GENERAL AVERAGE	60.2c	12.06
AVERAGE PRICE FOR WHOLESALE ICE—1951		
Dealers		$ 6.29
Car Icing		6.96
Carload Ice		5.08
GENERAL AVERAGE		6.11
AVERAGE PRICE FOR ALL ICE SOLD—1951		
Delivered Ice		$12.06
Wholesale		6.11
GRAND AVERAGE ALL ICE SOLD		9.08

Table VII shows the range in price for the different classes of trade in various sections. As usual these prices show considerable variation in all sections, due to local conditions. The variation, however, appears to show a wider spread than in previous years.

TABLE VII—RANGE OF PRICES OF DIFFERENT CLASSES OF TRADE IN VARIOUS SECTIONS

	High	Low	Diff.	High	Low	Diff.
	Eastern			Southern		
Domestic Trade	77.0c	63.5c	13.5c	76.2c	58.3c	17.9c
Light Commercial	60.0c	50.0c	10.0c	64.0c	49.2c	14.8c
Heavy Commercial	$10.14	$6.38	$3.76	$13.00	$8.33	$4.67
Dealers	6.58	4.30	2.28	7.43	6.18	1.25
Car Icing	8.50	5.00	3.50	8.75	6.00	2.75
Carload	6.00	4.00	2.00	6.00	4.50	1.50
	Midwestern			Western		
Domestic Trade	76.9c	66.0c	10.9c	130.0c	70.0c	60.0c
Light Commercial	67.7c	54.5c	13.2c	120.0c	50.0c	70.0c
Heavy Commercial	$10.78	$8.69	$2.09	$11.33	$5.50	$5.83
Dealers	6.88	5.03	1.85	10.00	4.50	5.50
Car Icing	9.12	5.75	3.37	8.00	4.33	3.67
Carload	6.37	4.25	2.12	6.00	3.50	2.50

In the tables showing the reports from the various cities, Canadian prices are included, but they are not shown in the above analysis. Prices reported from these Canadian points are somewhat higher than last year.



General view of Noel & Co. cold storage and ice plant at Nashville, Tenn., shows driveway and truckloading platforms.

PALLETS SOLVED THEIR PROBLEMS

Operator of a multi-story refrigerated warehouse says they couldn't operate without palletizing and tells why—A practical story of methods and results obtained

C. A. BOWEN, JR.,
Nashville, Tenn.
From an interview with
D. O. HAYNES

THERE were those who said that palletization was all right—maybe—for single storied cold storage plants, but as for multi-storied houses, well, it more than likely would never be done and if it was it probably would prove to be so impractical that it would soon be thrown out.

We all know that refrigerated warehouses of all types have mechanized their operations. The only question now is what do those who have had actual everyday experiences with palletization think of it? What is their seasoned judgment about this way of operating? Have they ever thought of throwing it out?

The first multi-storied plant in the southeast to palletize its operations is located in Nashville, Tenn. When I was passing through there recently I decided to drop in and see C. A. Bowen, Jr., president of Noel & Company. I figured if any one could give me the answers to these questions he could. We had met at a TRRF conference in Birmingham back in 1948 at the time he was just getting his program under way. How did he feel about it after two and a half years?

C. A. Bowen, Jr.

President and general manager, Noel and Co. Inc., Nashville, Tenn.

It wasn't long after we had started chatting that I knew I had come to the right person for my answers. Not only is C. A. Bowen, jr. an enthusiast, but he is also unselfish in his attitude toward telling others about what he feels has been a boon to his company.

Method Must Be Adapted

"Some people think I'm a bit hipped on the subject" was the way he started to tell me his story, "but I feel I have every reason to be. After all, I know what it has done for us and I am equally convinced that palletization could do the same for many who are skeptics if they'd only give it a chance. Of course, they can't just take some method they happen to see and apply it lock, stock and barrel in their own houses and expect it to work. But they can apply the principles and get results.

"That's exactly what we did. You remember," he continued," "my telling you I had read in ICE AND REFRIGERATION how you had palletized Merchant's Refrigerating Company's Newark warehouse. Well, that house is just about the size of ours—1,600,000 cubic feet. I determined to see what we could do about it here. It took some doing to select the right size pallet for our purposes and the

equipment to handle it under our conditions, but after I had worked out the details, I prepared an estimated budget for our Board of Directors. I'll tell you more about those figures later on, but with slight variations here and there—fewer pallets and an additional machine—we have kept within $1,000 of the original proposal. The Board gave its approval and we began placing orders."

This brief recital tells only part of the story. Mr. Bowen is one of the younger chief executives in the cold storage industry, but, what is even more significant, he came into it without any previous experience just nine years ago. He is prone to credit his training as a newspaper writer—he was at one time a sports reporter—as good background for developing the imagination. Be that as it may, the fact is that within six years he had come up through the ranks and did what few others had had the courage to do.

"Yes," he replied in answer to my question, "we were actually the first multi-storied plant in the southeast to palletize our operations."

The Noel Warehouse

A brief description of the plant will be helpful in picturing the conditions under which the work is being done. There is nothing unusual about the physical aspects of the Noel warehouse. Like many others it has grown gradually by the addition of buildings from time to time. The first unit, built in 1914, is five stories high. The first expansion came in 1917, when another five-story structure was added and finally, in 1926, the latest eight-story building was erected. The 1,600,000-cubic feet are divided into 21 coolers, 15 freezers and 5 rooms which can be used for either type of storage.

"We started with the selection of a pallet. Several factors had to be taken into consideration but the most important was the capacities of our elevators—3000 pounds. I felt that the larger the 'pay load' the better the operation and so we began to figure out what size pallet would give us the best set-up. If we used a pallet 36 x 48 in. which is a good one from the standpoint of patterns for the products we handle, we could not carry two of them on our elevators. On the other hand, if we adopted a smaller pallet, say one 24x36 in. the individual loads would be so light that we would not have an economical operation from the standpoint of powered equipment utilization. We finally chose one measuring 48x40 in. The advantage of having the stringers run the 48 in.-way is that the narrow width permits us to bring the pallet right out through the doors of refrigerator cars."

Many more refrigerated warehouses wish to reduce direct costs by handling goods on pallets. Consideration of volume occupied by pallets, aisle space, and equipment costs have posed problems, especially in multi-floor plants. The experience recounted by Mr. Bowen in this article shows how the problems have been solved in their operations and the handling costs have been greatly reduced.

A logical question was to ask about the loss of aisle space with a pallet carried on 48-inch forks. Mr. Bowen's reply is enlightening—it shows how given conditions affect decisions.

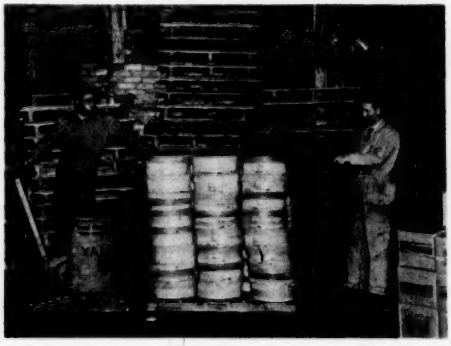
Aisle Space

"You may be surprised to know that it isn't a very serious matter with us." Then he went on to explain. "The doors to our rooms are not centrally located but are near the side walls. Consequently, our main traffic aisles are against walls. They were originally 6-feet wide and we have increased them to 7 feet. I find that this question of aisle space and possible loss of revenue is something that bothers most people in their thinking about palletization.

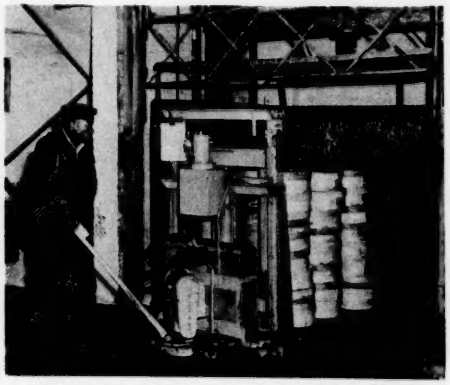
As a matter of fact, we haven't lost much, if any space. You see, the nature of our business is such that we handle a large number of small lots. We are in the center of Tennessee's dairy industry so that about 65 percent of the commodities we handle are milk products, especially cheese. Most of our receipts come in by truck and we accommodate customers by storing this product by vats.

We have always lost considerable space due to small lots, but it is now so easy to square up lots and to remove them quickly, even though piled one on top of the other when they are palletized that we have just as good capacity now as we had before. Most of our ceilings are 10-feet high in the clear and our floor loads are 250 pounds to the square foot so we are making full use of our net piling space.

"Our pallet is the airplane or semi-



Plant Superintendent Bernard Jones checks a load of cheese before it is run on the elevator to be taken to the storage floor. In the background are the semi-wing type pallets which permit the load to be spanned by the outriggers of the fork trucks.



The pallet load of cheese is being removed from the elevator by the Moto-Truc Hi-Lift which will stack it in the room.

wing type," Mr. Bowen continued as he began to discuss their operations in detail, "we can, therefore, use the stacker walkie-type of fork truck with out-riggers. We have four of these and, incidentally, we are particularly pleased with the rubber wheels in the outriggers of our latest model Moto-Truc. We find these to be such a saving on floors that we are having our earlier models converted to this newer construction.

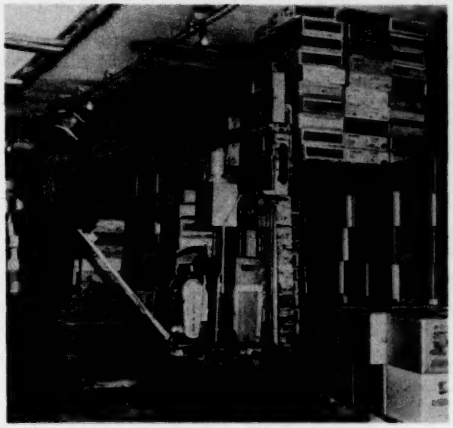
"In addition to the high-lifts we have four powered and three hand pallet trucks. The low-lift equipment is powered by nickel-alkaline batteries. A grocery warehouse near us had found these so satisfactory that we decided to try them out. As I'll explain later we use these machines almost exclusively on the platforms and not in the cold rooms. As time goes on we shall have a good opportunity to compare the value of the extra investment with that in lead-acid batteries. Of course, since the lead acid batteries are used in low temperature rooms we must charge them at both noon and night, which means they will have more charging cycles than the batteries used under normal environmental conditions. We shall, however, take all such factors into consideration before we come to any final conclusions."

Mr. Bowen then suggested that we walk through the plant so he could show me the operations as he described some of the more unusual procedures. As we stepped out of the office we were able to observe the operations at the truck platform. Several different kinds of trucks were backed in to the dock.

Handling From Trucks

"In this section of the country," he explained, "it is accepted practice to receive and deliver merchandise at the tailgates of trucks. We do not permit drivers to use our powered equipment, but if the loads are not too heavy they are able to handle palletized units from the front end of the carriers by means of a hand pallet jack. When the loads are too heavy for a man to handle alone our warehousemen help him with a powered truck which, as you see, we run into the carrier over a fairly light metal plate. This is no more than we used to do when we helped him handle a heavy load with manual equipment. As a matter of fact, the trucks now clear much more rapidly and the truckmen seem to appreciate our cooperation."

We then followed the loads of cheese which were being received to the elevators. The daisies were checked meanwhile and then taken to the elevator where a unit was deposited on the car. The load was not too great so we rode up with it. As we reached the storage floor an operator leading a high-lift truck was coming through the door of the room into the vestibule.



The stacking machine is shown at work in a room where there are many small lots.

"In all our operations," Mr. Bowen commented, "we strive to keep a steady flow of materials. This is an example of what I mean. We have found that it works out very well to have the man who puts the merchandise away remove the units from the elevator with his machine. By the time the car has gone down and returned with another load the operator is able to put away the unit previously brought to him. This balance is important and our supervision has spent a great deal of time training our machine operators and elevator men to work as teams. The operations now run very smoothly and we do not need to shift equipment from the platform to the room, nor do we have to have auxiliary equipment to move loads off the elevators up in the house."

We visited several rooms, both coolers and freezers. In some the refrigerating coils were stretched across the ceiling—in others they were arranged in banks over the aisles. This brought up another point, which Mr. Bowen explained.

"Were it not for these low-hanging coils we could use a non-telescopic machine, but under these conditions we have to have the telescopic feature in order to be able to maneuver under the piping."

In the rooms used for quick freezing the merchandise was "spread" to permit free circulation of the low-temperature air.

"This is one place we would like to be able to improve our operation. We place cans of frozen eggs, berries, cartons of meat and so forth received fresh-to-be-frozen on pallets one-high. We make a unit load out of several pallet loads. We move this unit into the room for freezing and, if space permits we just drop it on the floor, otherwise we double-tier. What we are doing is to use pallets as spacers. Of course, when we want to store the merchandise in the holding rooms we have to rehandle the packages to create snug-piled unit loads. So far, we haven't been able to work out a way to obviate this extra handling."

A short stop at the car platform concluded our trip. Here the unit loads were being created in the cars and the men were moving them out through the doors of the reefers with powered low-lift trucks. The dock was practically level with the racks and the cars were quite close so that a metal plate was the only bridging equipment needed. The operation was proceeding very smoothly with two men assigned to the car.

"Well, that's how we operate," said my host as we settled down in his office, "and now let's see what palletization has meant to us. We have invested $22,555 in handling equipment and accessories such as batteries and another $24,000 in pallets or a total of $46,555. In the spring of 1948 when we started our program we had a superintendent, two foremen who also act as checkers and twenty-two men. Today we have the

(Continued on page 61)

DISTRIBUTION OF FROZEN FOODS

Trends in frozen food distribution and warehousing show that new efficiencies are needed, with public refrigerated warehouses as integral part of distribution.

HARLAN HISSEN
President Pacific Coast Warehousemen's Association, Los Angeles, Calif.

I DON'T need to tell you that the last year has shown spectacular changes in the distribution of frozen foods. Changes that in some cases are appalling to the recognized distributor. Changes that are fraught with concern for the packer—large or small. We might just as well get right into the blood stream of this relationship, for after all, your industry and ours are both concerned with this transitionary move toward direct sale to chain or large buyer groups—and what it means to the distributor—the packer and the warehouseman.

I have just returned from a four week trip through the east, including a full day as part of a frozen food panel at the American Warehousemens convention in Boston in which distributors, packers and warehousemen put these changes under the x-ray.

Breakup Service Not Final Answer

The one thing that was clear to me was that frozen food distribution is still in a violent state of transition. I firmly believe that the most recent development—that of public trucker hauling from a breakup room in a public warehouse—is a long way from the final answer. It is just another step in the growth of "the baby giant." I think I can say with emphasis that nobody likes the breakup deal as it now exists. That it is not as yet in the hands of the traffic and transportation experts of the bigger chains, but rather temporarily, just a new sales plan.

I frankly feel that many true costs, many true values and many abnormal risks have been lost sight of in settling upon this method of distribution as the millennium. It is time to look at some of the problems that make the breakup deal the bugaboo that it is. So let's look at them for a minute and while doing so, let's keep our eye on the ball, and the ball is—"total costs" —for every time any service is performed by anyone without compensatory profit, that service is essentially short lived. That means bluntly, any time a warehouse performs a breakup service without being paid for it—to "bring in a deal"—it is essentially a loss leader in your industry. It is temporary—It is unsound.

Presented to the 1951 National Frozen Food Convention.

Store Equipment

I think we all agree that the major problem in your industry is lack of cabinet and freezer space in the grocery store. Just more cabinets is not the final answer. Tomorrow's grocery stores, to compete, must have a back freezer box. If the grocery store is too small to afford that, or calls it a luxury, then in my humble opinion, that store is on its way out. For with the advent of an increasing variety of frozen fruit—vegetables — concentrates — (not forgetting milk) and a spectacular development in pan prepared foods, such as breaded shrimp; a more than normal interest in good frozen cooked specialties and meats and fish, and we can't overlook the probability of retail pack frozen eggs in tomorrow's thinking—the sale of frozen foods retail is not going to stay in the bracket between 2 per cent and 6 per cent of a store's gross — but is going to be double that — conservatively — and that means that over 20 per cent of the grocery store of tomorrow will be under intensive refrigeration.

Changes in the distribution of frozen foods now in a state of transition, have created problems for members of the frozen food industry and refrigerated warehousemen. The subject is discussed here by a refrigerated warehouseman who has had many years experience in the handling and storing of frozen foods. His conclusion that sound, efficient, speedy handling should be established as the keystone of their operating pattern, will be of interest to both frozen food packers and refrigerated warehousemen.

In the final pattern, neither your industry nor ours is going to be fiddling around with breaking up packages or making penny ante deliveries of a commodity which is as important as frozen foods is destined to be. Labor today costs distributor or packer or warehouseman somewhere between five cents and seven cents a minute. There is a basic inefficiency in this breakup practice. The 1-dozen package offers economies in the breakup room but it is a costly luxury in mass handling.

Any time study will prove to you that labor picks up packages one at a time and that car or truck, loading or unloading, be it your warehouse or somebody else's, of a 10 lb. package, it is pretty expensive. So here is instance No. 1—of trading economy at one level for a plus cost at another. In some way or other these tiny packages should be bundled—taped or inner packaged into units of from 30 to 50 lbs. for later breakup. This is a job for your packaging expert.

Special Service Problems

Having one evil defined, we come down to problem No. 2—that of delivering to an individual store an utterly uneconomical order of a few dozen retail packages, a service made necessary by the above mentioned lack of cabinet space. Now, the hue and cry for a lower cost of breakup which has brought warehouses into this special service is occasioned by an inadequacy at the other end of the line. A given warehouse will say—"Gee! to get 10 million pounds a year I will perform any special service." When he attempts to do this with unskilled labor in refrigerated temperatures in space not designed for the purpose, he is immediately in a field which is strange to him as a warehouseman.

Not that it is unique or without background—for cheese, mayonnaise and countless other products have

all been temporarily "broken up" by public warehousemen for the past 30 years. I am not narrow in my concept of service to be performed by a warehouseman and believe that a live wire warehouseman performs any good, requested service which lies in the basic field of warehousing.

Countless warehouses deliver long lists of product to retail stores—in many instances 20 or 30 items of one to five cases each in a single order. These are costly deliveries, and if they constitute too large a portion of a warehouse's total deliveries, the warehouse cannot exist—but that is, and always has been, a part of a warehouseman's problem, and is or should be compensated for within the rate structure itself. Many evils in this phase of delivery can be corrected through closer cooperation of warehouseman and customer. Among suggested economies are the following:

1. Work out a specific time each day at the off peak of delivery so the customer trucks will not have to wait.

2. Work out at the executive level, order phoning so that the product will be ready for the customer's truck.

3. Point out to the customer the high cost of delivery of small lots to everyone concerned so that order units may increase in size.

4. Work out an integrated order form system.

5. Have product loaded on interchangeable pallets so that hand handling onto or off trucks may be avoided—an enormous saving in that it saves at least two handlings of each package—a thoroughly practical accomplishment as loads may be roped and product suffers far less exposure.

Future Patterns

There will never be any single pattern for the distribution of frozen foods. Large chains will build their own breakup rooms possibly with a considerable amount of carload space as an integrated part thereof. This has been already been done, I might say, it simply puts the warehouse in the position of a Federal Reserve Bank. In some communities where the distributor system is concentrated, this is a logical approach, whether I like it or not.

We must remember that if a distributor and a warehouse are housed in the same four walls and both of them grow, someone is going to be squeezed. Therefore a leased breakup room in a warehouse must be looked upon as transitory. I have such faith in this business of yours that I have no fear of the building of intelligently conceived distribution points. I can't help but feel that in the case of large chains or large grocery co-ops, that integration of frozen foods as a part of their entire perishable food distribution, is probably a more logical coalition than to feel that the distributor can work effectively only when he is housed within my four walls.

As we look at the relationship of frozen foods and refrigerated warehousing against the background of the spectacular growth of frozen food sales, one thing stands out clearly — our two businesses are closely and inevitably intertwined. As one of the panel members said in the Boston N.A.R.W. meeting, we are like twins. I will go farther and say we are now, and probably will always be, like Siamese Twins, and that means—everything that affects one industry affects the other.—H. N.

The current trend toward breakup rooms within a public warehouse means multiple warehousing in major communities. I am informed that, in some cities, it is incumbent upon the part of a packer wanting wide distribution to carry stocks in five or even ten warehouses. Now some of these warehouses are public warehouses, furnishing breakup rooms to one or two chain customers. Some may be warehouses which house actual distributors and some may be customer warehouses which may or may not be put under a field warehouse system depending upon the credit rating of the customer.

In other words, a packer carries stocks in a customer's warehouse for the packer's own account, a questionable practice in some cases and perhaps a reasonable practice in other cases depending upon the structure, the maintenance of the facilities, the ethics and the financial status of the customer. I wish to point out that this puts some one other than a warehouseman in the warehousing business and I offer only sound advice when I suggest that you study your contract carefully, that you be sure that your legal department understands the risks and that you and your customer, whose good will is of great importance to you, have a completely clear understanding of the responsibilities of bailee and bailor.

Multiple Warehousing

Now I mention these facts, not in criticism, but rather to point out to you situations that have evolved during the last few years, whether you like them or whether you don't. But the important point is: this variety of pattern gives birth to a serious evil — multiple warehousing — Now multiple warehousing breeds the most horrible type of inefficiencies. Some of them are pretty obvious, but at the risk of being redundant, I will list a few that come to my mind:

1. Higher inventories, freezing working dollars, costing more interest and creating extreme hazards in a critical or falling market.

2. Higher freight costs, such as minimum rather than maximum carloads, meaning higher per pound cost.

3. Split cars which mean higher loading and bracing costs, additional ice and salt, and delay and increased demurrage.

4. Increased exposure to damage and temperature change, always true in part car or part truck unloading, for on direct sales, who assumes risks of damaged packages?—shop worn packages found in cabinets—normal errors? all inevitable and costly when direct sales can run a million packages a week in a single market.

5. Much higher bookkeeping costs for the packers in keeping multiple stock records, not forgetting increased overhead.

6. More small lot charges.

7. Inefficient routing and increased labor in the packer's traffic department.

8. Costly back hauls, always necessary to balance stocks—let me quote some examples. Spinach is short. You are operating six warehouses within one metropolitan area. You bring in a car—put 1000 cases in customers warehouse A—1000 cases in customers warehouse B—and the remaining 1000 cases in a public warehouse. Customer A sells out. Customer B has ample stocks. The smaller customers that normally withdraw from public warehouse will be squeezed if you back haul to customer A. You cause antagonism by hauling from B to A. You make a half dozen people mad. You pay a lot of back hauling. The merchandise is unduly exposed. Yet if you don't do these things, maybe your competitor will. In fact, you're in a hell of a fix. This situation is existing in many metropolitan markets today, and is costing somebody a lot of money. It is not efficient dis-

tribution and without efficient distribution somebody else is going to get part of your share of Mrs. Consumer's dollar.

Costs Are Important

These costs can't be tossed off as unimportant. They are real—probably a little more real to a traffic manager—or the "old sour puss" who sits behind the desk and whose principal interest is the final figure on the balance sheet—than to the eager sales manager, but nevertheless real. Consider these points then as you contemplate this type of distribution. Ask yourselves this question — "What Price Economy?" Though the words "cost analysis" are to some folks a nasty word like "spit"—costs stare at the boss like a skeleton in the closet! Cost analysis isn't simply a salesman's guess; neither is it hiding the cost by transferring a job from one performer to another. Neither is it chiseling a supplier into a squeeze position!

Basic Requirements

Physical handling costs are very real in this day of spiraling labor and the increased cost of maintaining physical properties. Your business can only live as long as your product is given good care from producer to consumer. Good care means speedy and efficient mass handling. It means fanatical interest in temperatures. It means that your product must be handled through its entire course of distribution by people who are trained in the skill of handling frozen foods and these people must "give a damn" about the success of your business. They must be temperature conscious 24 hours a day!

I feel that, during this last year of transition, some distribution patterns have been casually arrived at. I feel that the frozen food industry has in many cases put price above quality in distribution. I can't help but feel that, in the quest for lower costs through the stream of distribution, you have sacrificed some promotional values which are of extreme importance in a growing industry. Just remember that your industry needs the helpful enthusiasm of all interrelated trades. If there isn't a decent margin for the grocer, his enthusiasm is lost, and if there isn't a decent margin for intermediate handlers the normal amount of enthusiastic promotion, that is done by these segments of the industry, dies on the vine. You can't afford to lose these promotional values.

Now I say all this with the full knowledge that distribution costs must and inevitably will be further proportionately reduced and that efficiencies can be created with public warehouses as an integral part of distribution. But I do feel that in the emphasis on greater sales and in the dog fight that has arisen for a greater portion of the consumer dollar—you are tampering with your fate when you do not put sound trained, experienced, speedy efficient handling as a keystone of your operating pattern.

Controlled Materials Plan Regulates Use of Three Basic Metals

A CONTROLLED materials plan which will allocate use of steel, copper and aluminum will be put in operation by the National Production Administration for the third quarter of 1951. It was expected that printed forms would be ready about May 1 for manufacturers with military and defense supporting orders to fill out to report to the NPA statements of their expected production schedules for July, August and September, and the amount of steel, copper and aluminum which they will require. When these reports are received NPA will begin allotment of specific amounts of these materials to producers.

A pamphlet covering the needs, purposes and operation of the new plan has been issued by the National Production Authority. This pamphlet explains that under this plan, defense supporting production and construction will be programmed and essential materials made available to makers of military and defense supporting goods. At the same time NPA will encourage other production to continue to the extent that materials are available and other NPA regulations permit.

The plan is based on the Controlled Materials Plan developed during World War II. This plan was developed as a method of guaranteeing that a balanced flow of materials be made available on time and in sufficient quantity for essential production.

Products Classified

The products coming under the Controlled Materials Plan fall into two categories "A" products and "B" products. "A" products are those where the most convenient method of production authorization is vertical. Producers of these products will get their authorizations and material allotments from their customers.

The "B" list includes products where it is most practicable to furnish authorization horizontally, direct to the producer. In general, this list will include certain civilian by-products, industrial machinery and equipment and components which are needed for defense. Producers on this list will obtain their authorization and allotment from their NPA industry division. It is planned that after the first quarter of operation, this Controlled Materials Plan will be decentralized. In World War II, it was found that in a great majority of cases, such authorizations and allotments were best handled through field offices. Most producers will then apply to their local offices.

Additional pamphlets giving detailed regulations and operational instructions will be issued and other basic material to implement the program is in preparation and will be issued on a continuing schedule. In addition meetings will be set up in key cities to acquaint business men with details of the plan.

As this information is made available, it will be reported in the general and trade press. Copies of regulations and procedural forms will be available to business men through the Department of Commerce field offices and through national trade associations and similar groups.

Construction Certificates For Defense Facilities

CERTIFICATES of necessity to encourage construction of 396 new or expanded defense facilities costing an estimated $1,310,799,399 have been issued by the Defense Production Administration. These certificates authorize the holders to deduct from taxable income from 40 to 100 per cent of the cost of the facilities during the next five year period. Of the total number of such certificates of necessity so far granted, approximately one third are for projects costing $500,000 or less.

This program was provided by Congress in the Revenue Act of 1950. The purpose of the program is to provide an incentive for quick expansion of the Nation's productive capacity where it is not sufficient to meet defense needs. However, no authorizations are made for industries where a check of existing facilities reveals there is no need for the proposed expansion, either large or small.

THE ICE INDUSTRY

NATIONAL ASSOCIATION OF ICE INDUSTRIES

Executive Offices
1706 L St. N. W., Washington 6, D. C.

Executive Secretary
Guy W. Jacobs, Washington, D. C.

President
H. O. McLain, Chicago, Ill.

First Vice-president
E. F. Condon, Los Angeles, Calif.

Second Vice-president
Wm. J. Ayers, Memphis, Tenn.

Treasurer
Geo. Steers, Jr., Kalamazoo, Mich.

THIS MONTH IN BRIEF

The Ice Industry is geared for the national emergency, prepared to fill its vital role in building and maintaining America's defense, according to Guy W. Jacobs, executive secretary of the National Association of Ice Industries.

The ice and tea industries will join with Sunkist lemons in a summer advertising campaign on iced tea.

The defense program is taking shape, according to a bulletin issued by the National Association of Ice Industries and plans are made by the Association to keep all members informed on developments as they occur.

Two new markets for ice, supplying ice for drinking water for tourists and shaved ice for Sno-Kones, have been developed by a New Mexico ice distributor.

A new ice making plant has been completed by a Canadian ice company with all modern machinery and equipment and a few novel features of its own.

A growing demand for ice cubes in the Chicago market is being developed by an ice company through food and drug store outlets.

Automatic control equipment has been installed in a new North Carolina ice plant to save hand labor and time.

Ice Industry Prepares to Meet Needs of Country in National Emergency

THE ice industry is geared for the national emergency," declared Guy W. Jacobs, new executive secretary of the National Association of Ice Industries. "Our companies are prepared again to fulfill their vital role in building and maintaining America's defenses. Many of them are already supplying ice for military purposes."

Mr. Jacobs pointed out that ice was an indispensable factor in this country's World War II effort. The stepped-up shipment of perishable foods — produce, meat and dairy products — increased the consumption of ice in refrigerator cars and trucks. Army and Navy bases used millions of tons of ice. War workers in thousands of housing developments depended on delivered ice for home refrigeration.

Five million tons of ice were supplied industrial plants during the war period for cooling processes necessary in the manufacture of munitions, chemicals, alcohol and synthetic rubber, Mr. Jacobs stated. Both military and civilian hospitals required considerable quantities of ice daily for the preservation of food as well as for surgery (Ice was and is often employed as a local anesthetic in amputation cases).

Ice-refrigerated boxes developed during the war are now carrying whole blood to our wounded in Korea. No mechanical method that would do the cooling job as efficiently or as economically could be found.

Widespread Uses of Ice

"There are over 6000 ice companies in the U. S., now producing a total of about 40 million tons of ice annually," said Mr. Jacobs. "Approximately one-third of that total goes into railroad refrigerator cars and refrigerated trucks. Another third is sold to commercial users (food stores, seafood and poultry handlers, hotels restaurants, etc.). Homes and food processing firms use the remainder. Industrially, ice plays a part in the manufacture of cigars, liquors, drugs, varnish, explosives, sausage, film and glue; it is also utilized in printing plants, bakeries and gold mines, and in the mixing of concrete.

"Domestically, our companies make regular deliveries to the 10 million homes which have ice refrigerators. And in recent years, we have shown a steady increase in sales of processed ice (cubes and crushed ice) to users of mechanical refrigerators for parties, picnics, and other special occasions."

Mr. Jacobs noted that military needs swelled ice production during the past war to over 52 million annual tons. "We had a sizeable problem on our hands in making ice obtainable where and when it was needed," he recalled. "It was necessary to expand old ice plants, build new ones, and in some cases even to dismantle and move complete plants to different locations. However, that expansion means that we could now boost yearly production to 55 million tons, if necessary, simply by using already-available facilities. Our chief problems would be manpower and maintenance equipment. Given an adequate allotment of each, we will be able to meet the maximum possible combined military and civilian requirements."

Iced Tea Queen is Chosen

SELECTED from more than 100 St. Louis finalists, Miss Doris Wolters has been chosen National Iced Tea Queen for 1951 by representatives of the tea industry. The title carries with it extensive gifts including a complete wardrobe, wrist watch, other jewelry, cosmetics and a tea service.

The tea industry noted the appropriateness of choosing a St. Louisan for the title since iced tea was first served in that city 47 years ago at the World's Fair of 1904. An English tea promoter, Richard Blechynden, is regarded as the "father" of iced tea because he first served tea with ice in it to the thirsty fair-goers.

Ice, Lemons and Tea Joined in Summer Advertising of Iced Tea

TWO closely related products, Sunkist lemons and Icemen's Ice will join forces with the Tea Council's $550,000 iced tea campaign to form a triple-barreled "all-summer-long" advertising, merchandising and publicity program.

Point-of-sale merchandising materials will be made available to grocers and restaurateurs through the Tea Council; the Tea Industry's national advertising in Life, Look, The Saturday Evening Post and 33 metropolitan newspapers will feature the related items and all publicity plans will include the three-item tie-in.

Anthony Hyde, managing director of the Tea Bureau, Inc., and vice-chairman of the Tea Council, said that "Both the lemon and ice tie-ins will be teamed up with the biggest single promotion ever put behind iced tea. People drink iced tea all-summer-long, therefore, grocers and restaurateurs find they get maximum sales by pushing it all-summer-long. Tea sales are already on the upward move and this powerful joint campaign will keep them on the increase. Although tie-in advertising has been done with considerable success in consumer publications, we believe that tea and its allies are pioneering in the field of tie-in trade advertising.

Ice Joins Tea Industry

Francis X. Timmons, director of Advertising and Publicity for the National Association of Ice Industries, said, "Relations between the ice and tea industries are as smooth as their products properly combined in a tall, cool glass. Because of our mutual interest in iced tea sales, we have a natural affinity for one another.

"It is good to know that tea men recognize the crystal-clear, taste-free qualities of iceman's ice. All their efforts have been directed toward improving the flavor of iced tea. Since ice supplied by local ice companies is pure and slower-melting, plenty of ice can be used without danger of diluting the beverage. True tea flavor is assured.

"To get this message across to retail outlets for iced tea, the Tea Council and the National Association of Ice Industries have hit upon a double-barrelled approach—cooperative advertising in leading trade publications. It's a new technique that offers greater profits right down the line. Most important, the consumer gets iced tea the way it ought to taste."

All merchandising and point-of-sale materials in connection with both the ice and Sunkist lemons tie-ins are available through the Tea Council, 500 Fifth Avenue, New York City.

New Booklet Gives Modern Ideas on Beverage Icing

A NEW booklet on beverage icing is being distributed by the National Association of Ice Industries. Introducing a whimsical thought, the front cover asks the reader if he ever served broccoli in his drinks. This leads naturally to the explanation that the idea may sound ridiculous and yet foreign flavors do get into drinks because of poor quality ice—NOT iceman's ice.

The desirable features of iceman's ice are further listed and described as crystal-clear therefore taste-free.

Front cover of new booklet on beverage icing

Local Ice Advertising Material Now Ready

ICE companies who plan to do local advertising this summer should make the effort as simple as possible, but they can save money, produce profitable results, and serve customers better by tieing-in with the current national advertising program.

Reprints have been issued by the Public Relations Department of the National Association of Ice Industries giving an idea of the themes of a good portion of National ice advertising. To assist progressive ice companies, the Department is considering preparation of mats of art work only. The proposed new mats will carry illustrations for use in one, two and three-column newspaper advertisements. To utilize any illustration the art work is simply cut from the mat and used in accordance with instructions. These mats will provide local advertisers with an easy means of developing effective advertising.

Why was I born?
by Paul Dunn
THE PARTY IS JUST GOING STRONG WHEN YOU DISCOVER YOU'RE FRESH OUT OF ICE!
Be sure to have all the genuine ice you want, when you want it. It's inexpensive—and convenient. Ice Cubes, Crushed Ice or Block Ice are readily available at a nearby Ice Vending Machine or Ice Station. Consult your classified telephone directory or phone your local Ice Company for the address of the one nearest you.

Cartoon style ice advertisement now ready

The Ice Industry and the Defense Program

DESPITE confusion and juggling of functions between government agencies, part of which cannot be avoided, the defense program is taking shape, says a bulletin issued by the National Association of Ice Industries. At the moment, it is extrial activities. Some of the agencies have new names, but roughly, their objectives and functions are about the same as for those which were created during the last war. There are a number of new faces in the bureaus, but many who were active during World War II are returning to government service. The orders are quite similar in purpose and scope to those of the early forties, but the methods of achieving the end do not always follow the established pattern.

At present only a single rating, known as a DO-rating, is authorized for purchases of materials and equipment. This rating was created to insure preference for defense orders over civilian demands for scarce materials.

Government Controls During Last War

Most of you doubtless remember the control over all building, conversions, expansions and the use of critical materials which was exercised by the government during the last war. Many believe that a similar controlled materials plan will be necessary this time. The real need for such an order, of course, will depend on the progress of the war, outlook for peace and the extent to which defense production disrupts the economy's free flow of trade. We have already submitted to the proper authorities preliminary estimates of the ice industry's requirements for materials for the years 1951 and 1952. The U. S. Department of Agriculture is to serve as claimant agency for the Industry just as it did during World War II.

If you have difficulty in obtaining materials and equipment for maintenance, repair and operation, the National Production Authority's Reg. 4 and Dir. 1 may help you. It was issued to keep existing facilities in top working condition at a time when increased quantities of critical materials are being channeled into defense production. Under it, your order for material is given a DO-rating (DO-97) which has the same priority value as the DO's issued by the Armed Services. The "97" is the symbol for the purpose of identifying the program to which the order is related,

Statement by The Executive Secretary

THE issuing of the accompanying bulletin gives me an opportunity to define for our Association members the course which your headquarters staff plans to pursue for the duration of the national emergency. I feel that you deserve and should expect such a statement from the Executive Secretary at this critical time.

First, however, before apprising you of our plans, let me add a personal word to the tribute paid Mount Taylor in President McLain's recent letter to you. Having been privileged to serve with Mr. Taylor during his 15 years in this office, I have gained the highest possible regard for him, both as a friend and as an associate. In my opinion he has rendered outstanding service to the entire ice industry, and it is my hope that his advice and assistance will be available to us for many years to come. Along this line, I am happy to be able to report that Mr. Taylor's health has already shown considerable improvement since his retirement from full-time duty.

Returning to my statement of policy, the following make up its main points for the foreseeable future:

As at all times, we are doing our utmost to keep abreast of the needs of you, our members. As these needs change, our activities and their scope must change accordingly. To whatever extent it is possible, we will try to anticipate these changes so we can shift the emphasis to meet the new problems presented.

These problems, of course, will result from the imposition of government controls. Wage and price controls are already here; manpower, equipment and other restrictions, it is certain, lie ahead. Profiting by the experience we gained during the last war, we have already established close contact with the various defense agencies during this planning stage. We are making ourselves known to the key officials and impressing them with the importance of ice and ice companies. We are confident that this spadework will pay good dividends later.

In doing this, we are continuing to carry forward the peacetime functions of the Association. However, as indicated above, current conditions of the nation and of industry generally, including our own, are necessarily requiring us to re-evaluate our Association activities, and to rearrange them as we go along in order to provide the time to perform the added duties the present Preparedness effort is producing. The staff members are fully aware of this added responsibility in so far as their work load is concerned and will, you can be sure, go all-out in rendering an effective combination peacetime and wartime service you you and the other members of the Ice Industry.

We are excellently equipped to perform this essential liaison. In the persons of W. T. Jobe, our General Counsel, and C. P. Austin, Director of Research and Engineering, we have two men who filled vital roles throughout the last war.

Mr. Jobe served as our government contact man in the years 1941-1945. He has reassumed a large share of that assignment in the present emergency and is handling it with the capability which the members of the Association have learned to expect of him.

Mr. Austin was chief of the Market Organization and Facilities Division of the War Food Administration during World War II. In this capacity he had direct jurisdiction over Ice Industry applications for new construction, conversions, expansions, and materials and equipment. His wide acquaintance among defense agency officials and his thorough knowledge of government procedure are vital to our defense service program.

Your Executive Secretary, it may be remembered, served actively in the Office of Price Administration for six months and as a consultant on Ice Industry prices thereafter for the duration.

While our Public Relations Department staff members, Francis X. Timmons and John G. Pool, have had no actual experience in government contact, their skill in creating a favorable impression for this industry can be easily adapted to such use whenever the occasion demands it.

We are on a sound dual purpose basis. We have a well-rounded peacetime program, now supplemented by a well-organized Industry-Government program which should insure fair treatment for the Industry under the coming controls. Your National Association staff stands ready, willing and, we believe, able to render you every necessary service in this national emergency.

Sincerely yours,

GUY W. JACOBS, Exec. Secy.
NATIONAL ASSOCIATION
OF ICE INDUSTRIES

and it has no significance as far as preference is concerned. (Note: This regulation was announced and received in the April issue of ICE AND REFRIGERATION.)

The regulation permits application of the DO-97 rating by business organizations without individual authorization by N. P. A. It is permissive. You are not required to use the rating to purchase MRO supplies, but the gimmick is that, if you do, then you must live by, and with, the provisions of the order. The rating may be used only for the purchase of maintenance, repair and operating supplies, and you are limited in using MRO supplies to the same dollar volume which you bought, by quarters, in 1950. It may not be used to purchase production materials nor to buy major capital items.

If the DO-97 rating is used for any purchase, all maintenance, repair and operating supply items, both rated and unrated, become subject to the quarterly limitation of the regulation. All purchases must then be within the limits of the company's quarterly quota, and complete records must be kept for the duration of the regulation and for two years thereafter.

Rating Not a Requisite

If you are able to buy all maintenance, repair and operating items without the use of the rating, you are free to do so. Then you would not be required to limit your purchases to 1950 quantities nor to keep the records required by the order. This would be preferable, of course. We believe, however, that more and more suppliers are going to insist that you furnish the DO-97 certification, because it may be extended just as any other DO-rating. Obviously, it becomes very useful to the supplier in that it may be extended by him in obtaining his materials.

How does one make use of the rating? He simply writes on the order, or on a piece of paper attached to it, these words: "DO-97, Certified under NPA Regulation 4", and then signs his name.

In addition, the regulation also provides for "minor capital additions" not exceeding $750.00 for one complete capital addition. This figure must include all items entering into the improvements regardless of whether they are acquired with or without the use of the rating. No addition may be subdivided to bring it under the limit. If any use is made of DO-97 for this purpose, you are required to charge against your MRO quota all material for minor capital additions ordered for delivery during that quarter, if (but only if) obtained by use of the DO-97 rating.

During World War II, shifts of population, changes in preparation and shipment of foods, and other factors made it difficult to provide a supply of ice for all areas and for all uses. The Department of Agriculture was responsible for the program aimed at adjusting supplies and avoiding shortages of ice. The national supply certainly is no problem now, but as was learned during the last war, local demands brought about by wartime or defense activities often tax local resources.

Looking to the time when conditions may be quite different, a similar program has been outlined. The activity is aimed chiefly at taking whatever steps are appropriate and necessary to insure an adequate supply of ice for the preparation, handling and shipment of the country's perishable foods plus sufficient quantities of ice for military and civilian requirements. Because of its interests in preservation and handling of foods, this program has again been assigned to the Department of Agriculture.

Latest on Price Control

The situation on price control remains very much confused. Considerable comment is prevalent pro and con as to the method and extent to which prices are to be regulated or fixed at particular levels. As of this date, so far as the ice industry is concerned, the following is the most accurate report available:

1—All ice company prices covering ice or other commodities or services sold or offered for sale are frozen at the highest ceiling prices prevailing during the base period of the General Ceiling Price Regulation, issued January 26, 1951. This base period was from December 19, 1950 to midnight, January 25, 1951. At the moment there are no exceptions. The regulation applies to every ice company, and heavy penalties are provided for violations.

2—The petition for an amendment to the Regulation, filed by the Association with OPS, seeking relief for winter price differentials is being processed within the agency. It was hoped that a favorable ruling would be had on or before April 1. Unavoidable delay has been encountered. The moment action is taken, we will report to the membership immediately.

3—The new and much publicized Manufacturers' Regulation scheduled to replace the existing Regulation, is to be released shortly according to reliable reports from within OPS. Just what its provisions will be and to what extent ice companies will be provided price relief, is not known. We have been promised to be among the first to receive a copy, whereupon its contents will be digested and reported to our membership.

4—Although the various OPS field offices have been set up, they have not been delegated the authority to receive or act on applications for price increases. The only place such an application should be filed is with the Washington office of OPS but, even so, we have been asked to request all ice companies to withhold filing individual applications until the new Regulation is issued.

5—Ice companies do not have to file any price data with OPS. Legally, all they have to do is to maintain their prices as prevailed during the aforementioned base period and make no increases until the current Regulation is either changed or amended.

Rhode Island Ice Company Sold

THE properties and other assets of the Rhode Island Ice Company, Providence, R. I., were purchased by Walter B. Chaffee, East Providence ice manufacturer. The company had been in receivership as announced in the March issue of ICE AND REFRIGERATION.

Mr. Chaffee, who owns ice company properties in Barrington and Marthas Vineyards had petitioned for receivership of the company to collect the principal sum and cumulated interest payments on $320,856 due and unpaid on first mortgage five percent sinking fund bonds which he owned. His bid of $130,776 for the properties and assets was accepted by the Superior Court. He said that the firm would be reorganized and the company maintained as a going concern.

The company properties include headquarters at 373 Reservoir Avenue, ice plants at Bald Hill and Toll House Roads in Warwick and at South Arnold and Cato Streets in Woonsocket, land in Smithfield and rental properties adjoining the other locations.

Raymond Wilber, who came to the firm last August as executive vice president and remained as receiver during bankruptcy, will continue with the firm. Mr. Wilber is also secretary of the New England Ice Association.

Jug-Icing and Sno-Kones—New Ice Market Opened by Profitable Side Lines

A NEW merchandising angle, that of icing drinking water jugs for tourists and others has been established by C. A. Meeker, owner of the Tucumcari Ice & Coal Co., Tucumcari, N. M. The city of Tucumcari is located on U. S. Highway 66 which is a main traveled tourist road. During the summer, tourists through that section have need for a plentiful supply of cold drinking water.

Four years ago when he purchased the plant, Mr. Meeker says, practically no one, except at the ice plant, made any attempt to supply ice for drinking water. Since the ice plant is located about a mile from the highway, many tourists would drive this distance out of the way to get their jugs iced.

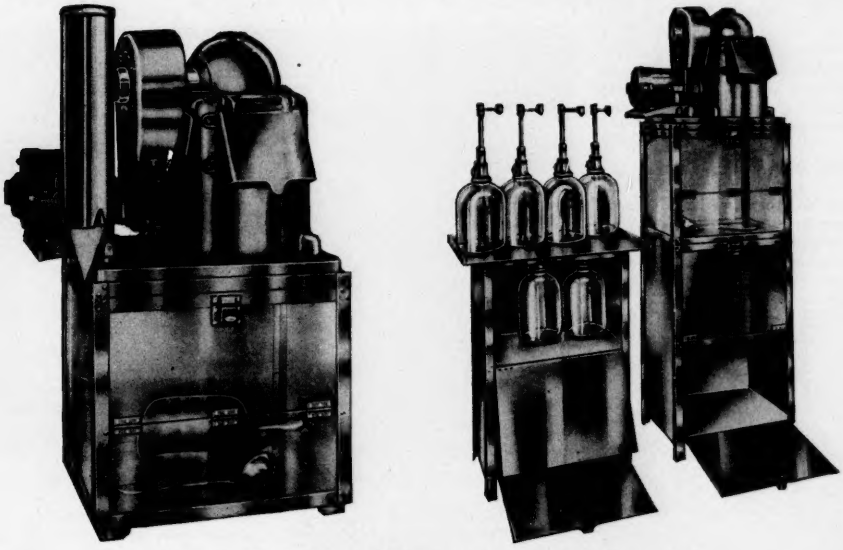
Writing some weeks after the information for this article was furnished, Mr. Meeker says that both ice jugs and Sno-Kones have been heavy tonnage builders. Sno-Kone sales the middle of April were from 100 to 200 pounds of ice a day per station and this volume is expected to increase when hot weather comes. The public likes Sno-Kones, he says, and will buy large amounts of them.

Deciding that this offered a market for the sale of ice, he had 200 metal signs made up, painted in three colors, with "jugs iced" in large letters on both sides. After several months effort, he induced three filling stations to install ice chests for a supply of crushed ice and to display two of the signs. It went over big. Not only did these stations make money on their ice sales, but many tourists made additional purchases. More and more filling stations saw the light until now nearly two thirds of all of them in that area are providing the service. In addition, several restaurants and small grocery stores have added the side line.

This business has had a natural growth since the first two or three were installed because tourists and others got in the habit of passing up stations that did not display one of the signs, and the competitive urge did the rest.

To get into this jug icing business will cost the station about $35. All that is needed is a small ice chest to hold about 200 pounds of crushed ice, a small scoop, and two or three signs.

The amount of ice purchased varies greatly. Some stations will use 50 pounds every two or three days. Others have purchased large ice chests that will hold as much as 900 pounds of ice and sell block ice in addition to icing jugs. A station will use 400 to 800 pounds of ice a day. On the average, however, most stations use approximately 50 to 100 pounds crushed ice each day. Mr. Meeker estimates that during the summer of 1950 they sold about 200 additional tons of ice during the season for jug icing. At an average of $14.00 per ton, the returns were not so big, but it was new business.



Front and side view of electric ice shaver for making Sno-Kones

Selling Sno-Kones

Another idea worked by Mr. Meeker is that of selling Sno-Kones. These are made by filling a paper cup with very fine ice and pour flavored syrup over it. These are sold from a dispenser.

There are now four such machines in Tucumcari. The one at the best location sells as much as 600 pounds of ice a day. The others vary from 100 to 300 pounds a day. The four machines during the summer months sold somewhat more than 100 tons of ice and at $14 a ton this was good business. Their experience shows that when people are exposed to these drinks they will buy Sno-Kones faster than they will soft drinks. This interests the small storekeeper because the profit is approximately three cents each compared to one cent or less for a soft drink.

A nice thing for the iceman, according to Mr. Meeker, is that no mechanical refrigeration device can compete with a Sno-Kone machine and since American people have the beverage habit, their sales possibilities can be readily proven. If only one-fourth as many Sno-Kone machines are installed at places that sell soft drinks, the tonnage of ice sales would make very nice business. Mr. Meeker says he's going to work on this angle again next summer and may even buy several machines and rent them to good operators.

Starting Sno-Kone Business

To go into the Sno-Kone business an operator will need a standard make machine which is nothing more than a grinder which will shave ice very finely, costing up to $250. There are less expensive machines on the market but Mr. Meeker warns that patrons want their ice shaved very fine and only the better machines will shave it fine enough. Also needed will be an ice cream cone scoop, several small syrup dispensers, an ice chest that will hold 400 pounds of ice, a good location, and a small shed attractively painted with a prominent Sno-Kone sign. The total outlay for such an outfit would amount to about $450.

Speaking of syrup, Mr. Meeker sounds another warning—that it is a serious mistake to try to economize on that item. A good quality Sno-Kone must be thoroughly saturated with syrup of the finest quality. After all, the cost of good syrup and finely shaved ice is less than one cent and, allowing a penny for depreciation and labor, there's still three cents profit, which should well satisfy even the most avaricious.

Regarding location, Mr. Meeker says that any heavily traveled highway will support one stand for every three to five blocks. Small community grocery stores are very good locations.

Mr. Meeker concludes with an idea (no charge) that may prove profitable to someone with a mechanical turn of mind. If someone, he says, would perfect an automatic coin-operated serve-yourself box which provides at least four flavors for Sno-Kones, he would not only be of great benefit to the ice industry, but he could certainly make himself rich.

For the ice man these two projects open up new markets for ice. For the operators of jug icing stations and Sno-Kone machines, it's new business too and corresponding new income. The filling station operator will net from $2.00 to $5.00 a day besides what he makes from sales of other items to jug ice customers. A Sno-Kone operator in a good location on a hot day will often net up to $30 a day. As late as November 1 a machine located near a school was showing a net profit of more than $10 a day.

Home Accessories Store Pays Handsome Profits for Ice Company

A HOME accessories store, opened January 2, 1950 in Gary, Ind., has paid handsomely for the Barnes Ice and Coal Company of that city. Average monthly gross sales since that time have been approximately $6,000 providing a net return of 7 to 8 percent.

Additional non-ice using equipment includes a complete line of sewing accessories, electrical appliances, deep freeze units, ornamental wrought iron work, etc.

After eight months, this store started showing a profit and sales

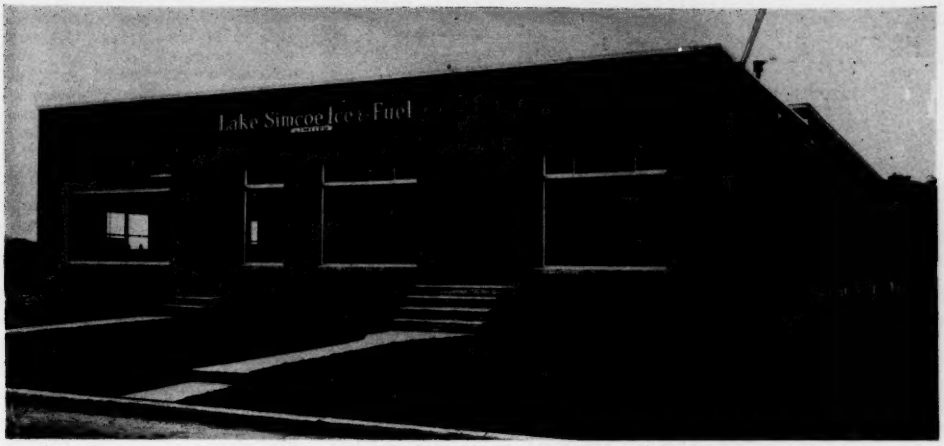
Home Accessories store operated by Barnes Ice & Coal Co., Gary, Ind.

Although established primarily to sell refrigerators and other ice-using appliances, the most important merchandise, from the standpoint of dollar volume and net profits, has been Pfaff sewing machines and service and repairs of all makes of sewing machines. In addition, Motorola radio and television sets are sold; also Whirlpool automatic washers and clothes dryers.

A complete line of ice-using appliances are sold including domestic refrigerators, picnic chests, ice cream freezers, beverage chests, commercial reach-ins, meat cases, fish and poultry cases and produce cases.

generally have increased every month since it was opened. Aside from the new business created, a mailing list has been built of more than 3,000 home owners, which the company has found exceptionally valuable for use in direct mail advertising for the ice, coal, and fuel oil departments.

The store was established in a section of a warehouse of the company in space that was not being used, fronting on a downtown street. The front, shown in the picture, has a Neon sign reading "Unique Home Accessories."



Front view of new Lake Simcoe Ice & Fuel Plant at Leaside

Modern One-Man Canadian Ice Plant Provides High Production Capacity

THE latest ice making plant of the Lake Simcoe Ice & Fuel Ltd. situated in Leaside, Ont., Canada, employs all the most up-to-date and a few novel features of its own. The plant was engineered and erected by the company's own staff of skilled workmen with years of experience in the field of refrigeration, modernizing and erecting of buildings and ice handling equipment.

Eighty Ton Plant

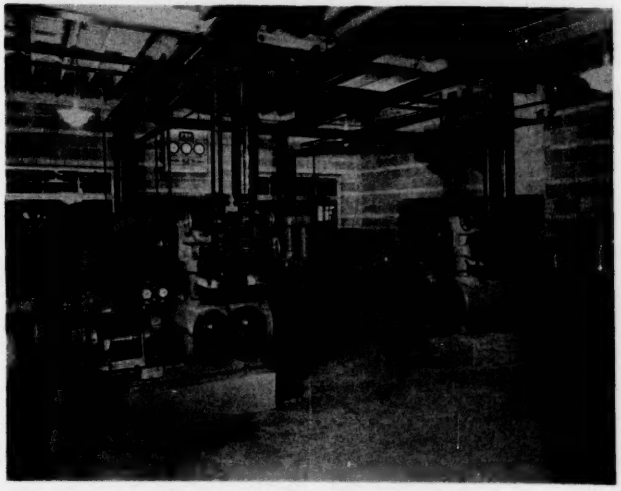
The plant is designed and constructed to manufacture 80-tons of clear ice per twenty-four hour day, on three shifts, of eight hours each, one man per shift. To achieve this record amount of ice in a one-man plant, the plant, engine room and day storage are on one level to eliminate all possible hazards to the workman and to insure an efficient operation.

Equipment consists of four 8x8 in. monobloc design compressors, V-belt connected to four constant speed 60 hp motor rotating 370 rpm. One air compressor V-belt driven by a 10 hp motor supplies 110 cu ft of air at 35 lbs gauge to a bank of dehumidifiers from where it is fed to the cans at 18 lbs gauge.

There are 648 400-lb ice cans in baskets of twelve cans. These are handled by a 3½ ton overhead crane employing a three point lift and designed to lower the cans to a horizontal position thus insuring a safe and efficient method of discharging the ice from the cans.

The evaporator consists of two banks of 1¼ in. pipe coils situated at either ends of the ice-making tank with gravity or thermo syphon liquid ammonia feed which has been precooled in an accumulator placed directly over each bank of coils.

Two slow speed motors directly connected to large propellers are employed to agitate the sodium brine at a speed insuring a differential of less than one-half a degree at any time at



Engine room of new Leaside ice plant

Tank room in new Leaside ice plant

any point in the ice-making tank.

An ice scoring machine is located at the end of the tank close to harvesting equipment and directly in line with daily storage so ice may be transferred through machine and into storage with a minimum of effort.

Condensers consist of two horizontal shell-and-tube units erected over a concrete basin with an evaporative cooling tower constructed above. Cooling water is pumped through condenser from bottom to top tubes in six passes (note reverse flow to hot gases) then directly to spray nozzles in cooling tower where it is broken into a fine spray dropping over racks in tower then over condenser shells to basin where the process is repeated. Pumping is achieved at the rate of 350 imp. gals per min. by a direct connected centrifugal pump in the basement of the building.

Two fan units, V-belt driven draw 40,000 cu. ft. of air per minute through the tower, discharging at the top. Interchangeable sheaves are used on these units for hot and cold weather operation. High and low pressure alarms are used throughout the plant.

Chicago Food Stores Sell Ice Cubes

THE Lincoln Ice Co. Chicago, as a part of its commercial ice sales has developed a number of retail outlets for ice cubes among food, liquor and drug stores. These ice cube sales stations are in scattered locations, from Evanston on the north side to the far south side and from the Loop to the western edge of the city.

This attractive carton holds 24 ice cubes and sells for 19 cents.

Typical of these is the National Food Store at Harlem and North Avenue on the Northwest side. This is a new, strictly modern food supermarket handling a full line of groceries and a select assortment of liquors. The store serves an average Chicago neighborhood of small homes and apartments.

Ice cube cabinet in National Food Store, Harlem and North Avenues, Chicago.

Cubes Sold From Frozen Food Cabinet

The cubes are displayed and sold from a small frozen food cabinet located adjacent to the liquor and frozen food sections. They come in cartons, 25 cubes per carton which sells for 19 cents. This cabinet, with cubes and an appropriate sign, was installed shortly before Christmas, 1949, and residents of the neighborhood soon expressed approval through their purchases of ice cubes.

Sales during week days are not so good but on week-ends and days preceding a holiday they are very good. Although this store is not the largest outlet for ice cubes in Chicago, it serves as an example of the possibilities. Sales throughout the year average about 30 packages a week; more during hot summer weather and days preceding holidays, and less during winter weather. Another outlet supplied by the Lincoln Ice Co., the Evanshire Drug Store, Evanston, sells an average of about 100 packages a week.

Servicing these cabinets requires very little additional effort by the ice company. Deliveries are made by the regular delivery trucks serving commercial customers in that area. Supplies are replenished in blocks of ten cartons which simplifies delivery and record keeping.

Ice Deliveries to be Handled by Dealers

ICE delivery service for the Union Ice Service, Inc., Springfield, Ill., is now handled by dealers instead of by company drivers as in the past. The change was effective April 2. All the new dealers, approximately 12 of them, are former drivers for the firm, who will now operate the same routes for deliveries as their own businesses. Dealers will rent delivery trucks from the firm, and will be under contract with it.

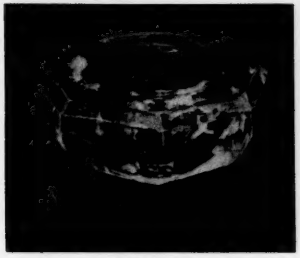
Reasons given for the change by C. B. Crossette, manager, were more economy of operation for the firm and the dealers, and better service. Mr. Crossette stated that in other cities where the plan has been used, the dealers try to give better service since they feel more responsible to the customer. The new plan will include both commercial and residential deliveries.

Fitch Leaves Ward

THE resignation of Gordon H. Fitch as a sales representative of the Ward Refrigerator and Manufacturing Company, Los Angeles, Calif., has been announced. Mr. Fitch has been associated with the company for more than twenty years and is well known by a large number of ice manufacturers throughout the middle west. His plans for the future have not, as yet, been announced.

Folder Boosts Glamor Ice for Parties

AN attractive folder advertising punch bowls and other party ice novelties has been issued by Oscar Mayer & Co., ice manufacturers of Madison, Wis. The front cover with black background and white lettering and illustrations says "Oscar Mayer Ice Service will Glamor-Ice Your Party with Ice Punch Bowls." A young woman is pictured serving a cup of punch from an ice punch bowl.



These crystal-clear ice punch bowls are effective for parties of all kinds and may be obtained with frozen-in decorations

The inside pages, with text and pictures, printed in black and green, carry on the story—how parties will sparkle when cool punch is served from a bowl or carved ice novelty—a most unusual touch that can be added by having fruits, flowers, or anything else frozen into a block of crystal clear ice.

This punch bowl and specialty ice business, according to George W. Heath, manager, has developed into quite an enterprise. Sales have expanded to the point that they found it necessary to increase production facilities so that they could make ten bowls at a time, and they have

This carved centerpiece will add distinction to any dinner table

bookings for two months ahead. They ship these bowls throughout that part of the country, and are now selling them to other ice companies who do not have the facilities to manufacture them.

Refrigerator Gas Kills Los Angeles Woman

ONE woman was killed, three other persons were slightly overcome and nearly 50 other tenants of an apartment house in Los Angeles, Calif., were saved early March 15 by police and firemen from seeping refrigerator gas fumes.

At three o'clock in the morning, Mrs. Margaret Shanahan, 60, called her sister, Mrs. Mary T. Riley, 55, of 1122 North Mariposa, crying: "Mary! I'm being gassed. Call the police." Mrs. Riley and her husband, James, rounded up Dr. William Schroeder of 5502 Santa Monica boulevard, and the three broke into the apartment and dragged Mrs. Shanahan, still sitting at the telephone, outside. She was dead.

The trio of rescuers were somewhat overcome themselves. Meanwhile, police and firemen wearing gas masks hurried through other floors, waking occupants and hurrying them to fresh air.

Ice Man Named Mayor Of Florida City

THE appointment of O. M. Early, owner and operator of the Fort Walton (Fla.) ice plant as mayor of Fort Walton was announced recently. He was appointed to take over the duties of the office when Mayor William B. Harbeson resigned to go on active duty as an officer of the Coast Guard. Mr. Early formerly was a member of the County Board of Public Instruction and has been active in the civic life of the community.

Prelude to an Accident?

THE operation of scoring machines or other processing equipment with the cover or guard removed has cost men's lives or the loss of fingers, arms and legs. Some companies make it impossible to operate the machine unless all guards are in place (I&R, April 1946, pg 47).

Safety engineers recommend machine guards to cover moving parts so that a man who slips and falls against the machine or into it will still be protected from an accident. There is no other way to provide really good protection and prevent injuries.

The Ice Industry

Spring is Here—The New Ice Season Has Opened

BY THE time this issue of ICE AND REFRIGERATION reaches the readers it will be spring in all but the most northerly sections of the country. Time to check delivery equipment and personnel for efficiency and appearance. A new paint job now will be a joy to behold all summer, and mechanical overhauling may save valuable time later. A program of training for delivery service men will get them off to a good start. If a man understands what is expected of him and what he can expect from the boss he'll do a much better job.

Advertising and merchandising plans, if not already developed, should be taken care of right away. A survey of the market should have been made. Special services like vending stations, sized ice, ice cubes, vegetable icing, refrigerator installation should be brought to the attention of the people. Don't forget that there are new markets for ice, of which, if you will work at it, you'll get your share. More and more ice is being sold for poultry icing, vegetable icing, fresh meat counters, vending stations. Personal selling to these outlets now will produce business and pay dividends before the end of summer.—CANADIAN ICE ASSOCIATION BULLETIN.

NEW ICE PLANT

Automatic control equipment is installed to save hand labor and time. Production capacity increased

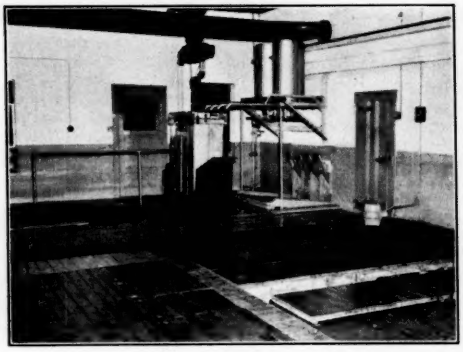
Ice crushing and scoring machine are shown on platform of new Tar River Ice Co. plant, Rocky Mount, N. C.

THE Tar River Ice Company has built a new plant at 919 South Church Street in Rocky Mount, N. C. This town is one of the fastest growing in the eastern part of the State; it is on the main track of the Atlantic Coast Line, and on U. S. Highway 301, which carries much traffic to and from Florida. Two ice plants, of 25 and 50 tons capacity, have been here for years. The combined output of these plants has lately been insufficient to meet the summer demand.

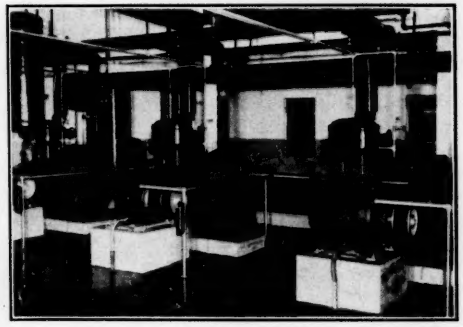
The new plant has a capacity of 30 to 33 tons. The building measures 65 by 85 feet and is far enough back from the street to provide a large concrete apron for parking space. The construction is substantial and up-to-the minute, and of very nice appearance. The ice is scored or crushed and packaged, as desired. The storage capacity is ample for holding 60 tons of ice.

Mechanical Equipment

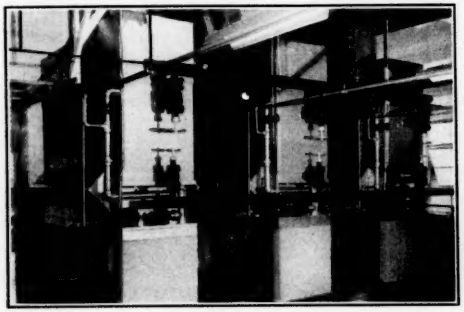
The brine race tank contains 400 all-welded ice cans, which are handled four at a time by grids. Three 6 by 6 ammonia compressors discharge into three evaporative condensers. Automatic control equipment is installed to save hand labor wherever practicable, the compressors being started and stopped by thermostats in the brine tank. The ice is pulled in either one or two shifts, as occasion demands.



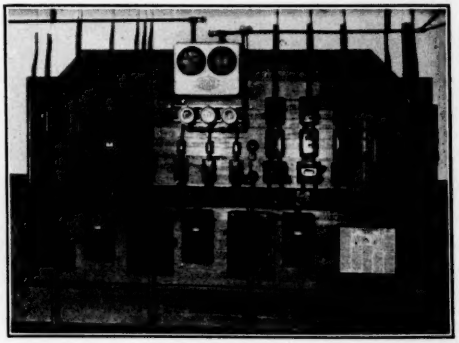
Brine tank room with 400 all-welded ice cans where four cans are harvested at a time, using grids.



Three Frick 6 by 6 in. compressors, under automatic control, make 30 to 33 tons of ice daily and cool a storage room holding 60 tons.



The three evaporative condensers keep head pressure within reason and save on consumption of water.



The switch board, with automatic control equipment.

Reports from Unit Ice Associations

Eastern States Ice Association Holds Nineteenth Annual Meeting

AVERY successful annual meeting and conference was held by the Eastern States Ice Association at the Warwick Hotel, Philadelphia, Pa., April 3. The attendance was better than last year and from the many expressions of approval, everyone seemed well satisfied with the one day meeting. The program covered the most important questions of present-day conditions in the ice industry.

There were no social functions this year except the association luncheon. This event was indeed an occasion of good fellowship and friendly intercourse between the members of the various states. Many of the companies also had their key men present.

Among the speakers were Guy W. Jacobs, executive secretary of the National Association of Ice Industries and William T. Jobe, general counsel of the National Association. These men brought the members of the convention up-to-date on the confused and complicated state of affairs brought about by the control of prices, wages, and materials.

New Ice Markets

Opening the convention, George M. Currie of Poughkeepsie, N.Y., president of the association, reviewed current conditions in the ice industry and touched briefly on some of the more promising new markets that are being opened up for ice. The ice industry, he said, is geared to produce fifty million tons of ice per year and it is not going to be easy to readjust it to a low of forty million tons and do it economically. Regarding new uses and new fields for ice, he called attention to the icing of sweet corn and other vegetables and for milk cases. A Montreal ice manufacturer, he said, is now experimenting with a new refrigerator that uses both electricity and ice. While it is still only in the experimental stage, it is considered by some to have great possibilities.

For one of his company's dairy customers, they had designed a crusher and elevator which elevates the crushed ice to a hopper which is located so that milk cases can be placed alongside the hopper and a pre-determined amount of crushed ice discharged on each case by means of an automatic trip. The customer is not only well pleased with this device but is using more ice than he did before.

Selling Ice Appliances

William M. Pauley, Diamond Ice & Coal Co., Wilmington, Del., told about his company's success in selling ice appliances. Their selling program, he said, consists in the following elements: An adequate inventory in quantity and variety; proper display in as many locations as possible; well-planned sales training program for all ice route salesmen; well-trained salesmen who are offered an incentive in the form of commissions in addition to their basic salary; a sufficient amount of advertising through newspapers, radio and direct mail.

The company carries a full line of all ice-using equipment and appliances. Regarding refrigerators, they had found that incentive selling plans for the ice driver salesmen and foreman had brought better results than any other plan they had tried. Regarding the future, they plan to continue a budget sales program tailored to meet their needs. In addition to refrigerators, they had been very successful in selling ice storage chests.

Officers Elected

At the conclusion of the afternoon session, the following officers were elected for 1951-1952:

President, George M. Currie, Poughkeepsie, N.Y.

Vice-presidents, James B. Post, Wilkes-Barre, Pa.; H. Hammond Snyder, Alexandria, Va.; Aubrey S. Bowen, Binghamton, N.Y.

Secretary-treasurer, Samuel Freer, Philadelphia, Pa.

Directors: Aubrey S. Bowen, Binghamton, N.Y.; Edgar Brick, Trenton, N.J.; H. G. Godshall Lansdale, Pa.; Melvin J. Burnham, Pikesville, Md.; John E. Overbey, Danville, Va.; Walter F. Hyde, Washington, D.C.; George O. Hendrickson, Salisbury, Md.; James B. Post, Wilkes-Barre, Pa.; Lewis Jacobs, Hanover, Pa.; George M. Currie, Poughkeepsie, N. Y.; O. Ashby Reardon, Alexandria, Va.; Wm. P. Wagg, Philadelphia, Pa.; L. E. MacIntire, Chester, Pa.

Indiana Association Of Ice Industries

ROBERT W. WALTON, Exec.-Secy.

THE month of March saw the termination of another successful ice service men's training program in Indiana. This marked the second year the Indiana association sponsored a training program in cooperation with Indiana University Department of Distributive Education. Again as in 1950 the meetings were conducted by G. Elwood Hookey, Indiana University staff member. The 1951 program stressed service and customer relations, and was well received by ice company participants. The training was carried to approximately 75 percent of member companies.

All Indiana ice companies are preparing for the coming ice season, and indications are that 1951 will prove to be a better ice year, at least weather wise. Indiana's Mark Purcell of Rushville, Ind., who has an envious record in predicting the outcome of seasons, has ventured that 1951 will again see normal temperatures in Indiana. Should this prediction come true, we will unquestionably see a favorable trend in ice tonnage.

Sweet corn icing activity is expected to grow in Indiana during the coming months. Already a number of growers have indicated their intention to ice their sweet corn crops. Such activity is providing a much needed new market for ice. The majority of chain stores in 1950 demanded iced sweet corn, and we will aid the huge A & P chain in 1951.

It is expected that several statewide and district merchandising forum meetings will be held during the coming spring and summer months. Much interest is being displayed in the merchandising of ice using appliances, particularly in the field of vegetable icing. It is evident that much can be done to tap this still highly undeveloped market, although considerable progress has already been made in some areas.

The association will exhibit at the annual convention of the Indiana Retail Grocer's Association on April 15, 16, 17 at the Claypool Hotel in Indianapolis. We will join with Trusty Manufacturers, Inc. of La Porte, Ind. in this display. This association has supported the grocer's convention for many years, and it is felt that our participation has made a definite contribution toward grocer acceptance of the ice display method.

The Ice Industry

Virginia Ice Manufacturers Annual Convention

THE annual convention of the Virginia Ice Manufacturers Association was held March 21-22 at the Hotel Chamberlin in Old Point Comfort, Va. There was a very good attendance of about 80 members and guests.

The business sessions included a roster of speakers from the National Ice Association and practical ice men. C. P. Austin and Wm. T. Jobe of the National Association of Ice Industries brought the members of the association up-to-date on their respective national activities. Other speakers included Walter E. Bernd, Washington, D. C., J. H. Hoffberger, Baltimore, Md.; Emmett W. Hines, Jr., Armstrong Cork Co.; Dr. Nelson Marshall, Director of Virginia Fisheries Laboratories, Gloucester Point, Va.

At the final session, officers were elected as follows:

President, J. C. Epley, Charlottesville.

Vice-presidents, J. F. Elliott, Jr., Charlottesville; W. M. Land, Norfolk.

Secretary-treasurer, H. H. Snyder, Alexandria.

Executive Committee: R. F. Butler, Richmond; Harry Hammond, Alexandria; W. F. Hyde, Arlington; V. V. Jinkins, Ashland; F. A. Mitchell, Hampton; S. C. Newman, Farmville; L. R. O'Hara, York Town; J. E. Overbey, Danville; O. A. Reardon, Alexandria; N. C. Taylor, Tappahannock; H. A. Connell, Norfolk; H. M. Beam, Norfolk; P. D. Copes, Tasley.

Unit Secretaries Hold Annual Spring Conference

THE annual spring conference of the Unit Ice Association Secretaries was held at Washington, D. C., April 26-28. Thursday and Friday mornings were free for the secretaries to visit their legislative representatives and staff members of the National Ice Association.

The afternoon programs were arranged for presentation and discussions of current problems in their association work, also some last minute information on things having to do with the defense program. Two panels were conducted with top level consultants and high government officials to provide this information. Saturday at noon a top government official defined the trade association's place in the overall defense program.

Northwest Association Annual Convention

THE annual convention of the Northwest Association of Ice Industries held at Vancouver, B. C., Canada, March 29 and 30 attracted an excellent attendance of members and guests who listened appreciatively to the very interesting program. Ideas picked up on the convention floor, it was universally stated, were worth much more than the expenses of the trip.

Officers for 1951 were elected as follows:

President, L. K. Davidson, Portland, Wash.

Vice President, W. R. Ridley, Vancouver, B. C., Canada.

Secretary-treasurer, W. L. Burns, Yakima, Wash.

Executive secretary, L. F. "Lu" Marsh, Portland, Ore.

Directors: Wm. Baker, Seattle, Wash.; Roy Bennett, Seattle, Wash.; F. Croteau, Spokane, Wash.; Duane Dryden, Tacoma, Wash.; Walter Felbrick, Oregon City, Ore.; Ceics Goodrich, Vancouver, B. C.; Al Micelli, Roseberg, Ore.

It was announced that the convention next year will be held at Yakima, Wash., the approximate dates being March 26-28.

Plans were made to hold the first of two conferences held annually each summer, in Aberdeen, Wash., probably about July 12 and 13.

Missouri Valley Merchandising Forum

FORTY-SEVEN members attended the Spring Meeting of the Missouri Valley Ice Manufacturers Association Merchandising Forum held in Jefferson City, Missouri, Tuesday, March 27, 1951. Discussions were held on legislative matters, O.P.S. regulations, engineering problems, the icing of poultry and other matters of interest to those in attendance.

Fred Buzen of the Poultry and Egg National Board was present at the meeting to tell about the program he is conducting for butchers to teach them the various methods of merchandising cut up chicken and turkeys, and the importance that ice plays in this new selling plan. He also gave an outline of the supplies that are needed for one of his demonstrations.

Several of the members present told of their experience in cooperating with the poultry industry in their areas, and how their ice sales have been increased due to the expanding of the poultry business.

American Ice Report

THE American Ice Co. New York, has no present plans for purchasing the remaining 17,747 shares of its 6 percent non-cumulative preferred stock or offering an exchange involving common shares, it was stated at the annual meeting. Peter A. Buehrman, president, told stockholders that the company acquired "a substantial amount" of its common stock two years ago for the purpose of making a conversion offering to preferred holders. Because of the price levels of the two issues, however, such a plan has not proved feasible, he said.

The decline in net income to seven cents a share on the common stock last year from $1.03 in 1949 resulted from unfavorable weather in the summer, when ice sales are heaviest, Mr. Buehrman stated. The management is aware of the need for diversification of operations, he said. Ice, which formerly constituted the major portion of the company's business, now represents 41 percent, laundry services 14 percent, and fuel 45 percent.

Consumers Company Sold To Texas Interests

PURCHASE of controlling interest in Consumers Company, Chicago building material and retail coal business, by the Murchison interests of Dallas, Tex., has been announced by Robert C. Reed, president of Consumers. Control was acquired through purchase of Consumers' stock by the Murchison group for an undisclosed price. The company sold its ice business to the City Products Corp. in 1948.

The present Consumers Company was formed in 1937 after reorganization of the predecessor company of the same name. The original Consumers Company was formed in 1913 through merger of several old Chicago companies including Knickerbocker Ice Company and City Fuel Company.

Illinois Plans Research Project on Icing Corn

A RESEARCH project on the precooling and package icing of sweet corn will be conducted this summer by the Division of Markets, Illinois Department of Agriculture under the direction of B. F. Hartline. The Illinois Association of Ice Industries and the National Association of Ice Industries are cooperating. The corn will be grown in the vicinity of Anna, Ill.

Refrigerated Warehousing Industry

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices
TOWER BUILDING, WASHINGTON 5, D. C.

Executive Vice-president
WM. DALTON, WASHINGTON, D. C.

Secretary
JOS. H. COLQUITT, WASHINGTON, D. C.

President
J. P. JOHNSON, WASHINGTON, D. C.

Vice-president
A. B. EFROYMSON, CLEVELAND, OHIO

Treasurer
C. E. SIMMON, OKLAHOMA CITY, OKLA.

THIS MONTH IN BRIEF

Requirements by the armed forces of dairy and poultry products for 1951 were discussed at a meeting of the Pacific Dairy and Poultry Association by a representative of the Quartermaster Market Center System. A greater volume than for 1950 will be needed, he said.

Studies of interest to growers, warehousemen and distributors were made recently on the storage time of Emperor and Almeria grapes. Results show that greatly increased storage time may be obtained with use of germicidal dips and wrapping film.

A proposed maximum price regulation for the refrigerated warehousing industry was discussed at a meeting of the Cold Storage Advisory Committee with representatives of the Office of Price Stabilization.

The monthly report on cold storage holdings for March 31 shows the occupancy of cooler space was the same as the month before; freezer occupancy was down slightly in accordance with seasonal trends.

Requirements of Dairy and Poultry Products for 1951

SPEAKING at a meeting of the Pacific Dairy and Poultry Association in San Francisco March 3, David Hume chief of the Dairy Products and Poultry Branch Headquarters Quartermaster Center System, outlined anticipated requirements of dairy and poultry products for 1951.

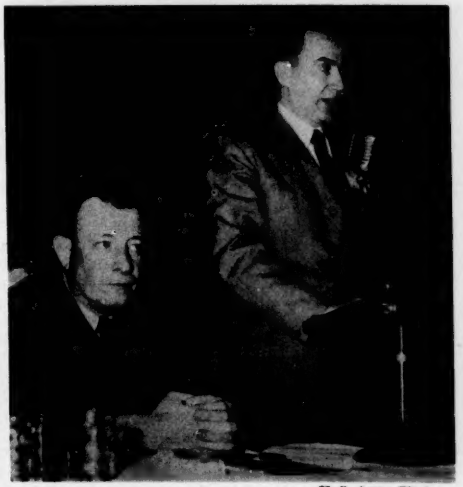
Military Needs

He pointed out that military needs are expanding; that the variables in the future make accurate forecasts of needs extremely difficult and hazardous. However, one thing is certain. The system will call on the industry to supply a much greater volume during 1951 than it did during 1950. Mr. Hume set forth as clearly as possible the extent to which the Pacific States Industry participated, the overall Market Center volume in 1950, and endeavored to advise what the national requirements are expected to be in 1951.

Delegates were advised of procedures to be followed in furnishing supplies that will be required. Keen interest was shown by several producers who have not previously bid on Armed Forces requirements, and it was evident that additional sources of supply could be expected.

MILITARY REQUIREMENTS OF DAIRY AND POULTRY PRODUCTS

	Purchased in 1950	Dollar Value	Procured from Pacific Slope Dealers	Estimated 1951 Requirements
Butter	33,000,000 lbs.	$20,500,000	6,400,000 lbs.	80,000,000 lbs.
Cheese	13,200,000 lbs.	4,500,000	1,530,000 lbs.	15,000,000 lbs.
Turkeys	19,200,000 lbs.		11,000,000 lbs.	28,000,000 lbs.
Other Poultry	64,500,000 lbs.		5,160,000 lbs.	130,000,000 lbs.
Eggs	2,100,000 cases		273,000 cases	5,000,000 cases



Speakers at annual convention of Pacific Dairy and Poultry Association. Col. C. F. Kearney (left) Commanding Officer, Quartermaster Center System, Chicago, Ill., and David L. Hume (right) Chief, Dairy Products and Poultry Branch, Quarmaster Market Center System, Chicago, Ill.

—U. S. Army Photo

Shoemaker Elected Director Associated Industries

THE election of Garth A. Shoemaker, of Elmira, N. Y. as a director of Associated Industries of New York State, Inc. was announced by Martin F. Hilfinger, president of Associated Industries, following a meeting of the Association's directors in Rochester.

Garth A. Shoemaker

Mr. Shoemaker is vice president and treasurer of the Hygeia Refrigerating Company of Elmira. He is president of the Citizens' Public Expenditure Survey of New York State, a director of Freedom on the March, and chairman of the Non-Partisan Good Government League of Chemung County. He was appointed by Lt. Governor Moore to the commission on teachers' salaries and is a member of the New York State Conference on Unemployment Insurance of which Mr. Hilfinger is chairman. He is also president of the New York State Association of Refrigerated Warehouses. For his work with the Citizens' Public Expenditure Survey he was recently awarded a special citation by Coronet Magazine. He attended Cornell and St. Lawrence Universities, graduating from the latter in 1935.

His father, J. Ray Shoemaker, who is president of Hygeia Refrigerating Co., was an early director of Associated Industries. He has served as a director emeritus since retiring from the board.

"As an outstanding business leader and an energetic worker in the cause of good government, Garth Shoemaker is continuing his father's distinguished record of service in the public interest," Mr. Hilfinger said.

Mr. Shoemaker succeeds Matthew E. Kennedy, president of Kennedy Valve Co. of Elmira, who retired after serving since 1934.

Price Regulation For Refrigerated Warehouses

A PROPOSED maximum price regulation for the refrigerated warehousing industry was discussed April 2, 1951, when the cold storage Industry Advisory Committee met in Washington with representatives of the Office of Price Stabilization.

Following the meeting, Jerry P. Johnson, president of the National Association of Refrigerated Warehouses, stated that the Industry Advisory Committee had made detailed recommendations to OPS during the joint conference.

"We are optimistic," Johnson said, "that most of our suggestions will be incorporated into the formal price regulation when it is issued. The Committee took great pains," he continued, "to see that its recommendations were in the public interest and that they were as fair as possible to the industry as a whole."

At the conclusion of the warehousing industry conference, OPS appointed a special interim committee to maintain close liaison between the industry and the price stabilization agency.

Refrigerated warehousing Industry Advisory Committee members, appointed by the Office of Price Stabilization, are: J. Q. Adams; V. O. Appel; L. M. Ashenbrenner; John M. Baer, Frank Degen; E. M. Dodds; Richard Doncaster; H. Farnsworth; H. A. Gross; W. F. Henningsen; J. P. Johnson; T. E. McCrary; B. A. J. Mosey; C. M. Smith; and E. F. Swanberg.

U. S. Cold Storage Corp. Income Shows Gain

THE consolidated net income of the United States Cold Storage Corp. for 1950 showed a gain over the previous year as a result of higher average storage occupancy, according to E. M. Dodds, president. The egg and soft drink operation did not do as well as in the previous year.

Net income for the company which has plants in Kansas City, Chicago, Detroit and Dallas, was $422,556, equal to $3.91 a share on the outstanding 108,000 shares of common, compared with $365,102, or $3.79 a share on 90,000 shares outstanding a year earlier. The additional stock represented a 20 percent stock dividend paid last November.

The company owns the Royal Crown Bottlers, and sales this year are running well ahead of a year ago, Mr. Dodds said.

Eastern Chapters NARW Hold Joint Meeting

A JOINT meeting of the New Jersey State Association of Refrigerated Warehouses and the North Atlantic Chapter of the National Association of Refrigerated Warehouses was held at the Hotel Chalfonte-Haddon Hall, Atlantic City, New Jersey, April 5 and 6, 1951.

The opening meeting was held following a cocktail party and dinner, Thursday evening. Dr. H. C. Diehl, director of Refrigeration Research Foundation and William Dalton, Executive Secretary of the N.A.R.W., offered excellent presentations pertaining to Research and National Association affairs. Entertainment added the final touch to the evening.

Conrad Proebstle, New Jersey Association chairman, presided over the morning session on Friday and Jerry Johnson, North Atlantic Chapter chairman, in the afternoon.

Harold K. Osgood, director, Storage and Warehousing Division, Defense Transport Administration, Washington, D. C., and James Raeder, Transportation and Warehousing Branch, Production and Marketing Administration, Washington, D.C., offered remarks on "One Crop Houses."

Other speakers were Horace W. Wilson, Quaker City Cold Storage Co., Inc., Philadelphia, Pa., "In-and-out Handling Costs"; James Straub, Merchants Refrigerating Co., New York, N. Y., "Storage and Refrigeration Costs"; Cyril Leech, Frick Company, Philadelphia, Pa., "Freezer Costs"; Jerry P. Johnson, Terminal Refrigerating & Warehousing Co., Washington, D. C., "Legislative report."

The next meeting will be held at the Hotel General Brock, Niagara Falls, Thursday and Friday, September 20 and 21, 1951.

Miller to Head Canadian Transportation and Storage

THE Canadian government has appointed Dr. G. B. Miller to look after Canadian laws affecting an important aspect of good food—the transportation and storage of perishable foods. Dr. Miller has been an expert with the Agricultural Department in the movement of perishable products for some years but now is being named head of a new unit to be known as the transportation and storage section. That means the problems associated with those fields will come under one head instead of several. Dr. Miller's staff will include cargo inspectors in Canadian and British ports.

MORE STORAGE TIME FOR GRAPES

Report on studies for improving quality of Emperor and Almeria grapes shows how their time in storage may be increased, retaining salabilty and flavor

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Department of Food Technology
in cooperation with
Refrigeration Research Foundation

Increase of storage time for grapes will benefit the grower, the storage warehouseman, distributor, and the consumer. Field tests on 3,000 pounds of Emperor grapes for each of two seasons have disclosed that at least five combinations of chemical dips and overwrap were significantly superior in mold inhibition and equal in flavor to a common commercial treatment. If these overwraps are used, grapes may be held in ordinary cold storage at any location and with other commodities since warehouse fumigation is unnecessary.

Lugs of grapes were held in commercial storage at 33 to 32 F. and one-half were evaluated at 16 weeks when obvious deterioration had occurred, and the remainder after 20 weeks storage. Evaluations were based on per cent of saleable grapes, on the basis of the prevalence of mold, and flavor evaluations by taste panels.

Results show how the type of wrapping film, kind of treatment, and length of storage time all directly affect the salability and flavor of Emperor grapes.

ONE of the principle factors responsible for deterioration of grapes in refrigerated storage is destruction by micro-organisms. particularly molds, which either are present on the product and carried into storage or acquired during storage. Methods for reducing storage losses may be directed toward both sources of contamination by: (1) germicidal treatments before storage to reduce infection already acquired, (2) by maintenance of a germicidal condition during storage to arrest micro-biological activity and (3) by physical protection in the form of overwrap films to eliminate storage contamination.

With this point of view a group of exploratory experiments was begun in an attempt to find a better method of holding table grapes in cold storage. Germicidal treatments were developed by dipping bunches of grapes into aqueous solutions of test chemicals. The selection of the compounds was based on information gained from "in vitro" potencies reported in the literature. Germicidal conditions during storage was attempted by maintaining a low concentration of gaseous sulfur dioxide in the storage container.

For this purpose grapes in commercial lug boxes were overwrapped with a plastic film which would control the rate of gas and moisture vapor transmission. Solid potassium metabisulphite served as the source of SO_2 in the package. Since the rate of SO_2 liberation is a function of both the relative humidity and the existing vapor pressure of SO_2, both of which are controlled by the overwrap film, the resultant SO_2 concentration in the package was presumably constant. Finally, overwrapping was used to prevent recontamination of grapes which had received germicidal dips prior to storage.

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NOTE: This is the first of a two-part article. The second will be published in an early issue.

Germicidal Dips

In order to test and screen a number of potential disinfectants bunches of grapes were dipped into the germicidal solutions for a specified time, drained and stored. Untreated samples served as controls. A non-toxic wetting agent, "Aresket", of Monsanto Chemical Corp. was added to the solutions so that contact of the solution with the surface of the produce would be improved. This wetting agent was not used with quaternary ammonium compounds which possess good wetting properties themselves.

After dipping and draining, each bunch of a particular treatment was placed on trays in a manner that separated it from others to prevent contact contamination. Storage cabinets were cleaned to avoid infection. The samples were stored at room temperature and a high relative humidity (75-95 percent). This condition was selected because it was a method of accelerated storage which had been found effective for rapid evaluation of treatments.

Spoilage Evaluation

When spoilage became evident the grapes were removed from storage and evaluated. The effectiveness of the treatment was judged by comparing it with correspondingly handled untreated controls for mold, rot or injury caused by the chemical. Observations were made only once for a series since handling the produce for close inspection would nullify any effect of disinfection. Of the chemicals tested only those were considered promising which caused no apparent damage to the product and which reduced mold and/or deterioration. For these initial screening tests two consecutive series of chemical treatments were run using three samples for each treatment. When the results were questionable the treatment was not considered satisfactory.

On the basis of the tests just described certain treatments were found to give promise of improving the storage quality of table grapes. These were evaluated on a larger scale using one or two lug boxes of grapes instead of bunches for testing. The treatments found effective are reported in Table I.

In this larger test, twenty-five lugs of Emperor and five lugs of Almeria grapes were obtained direct from the grower and trucked to the laboratory without delay. The uniformity and

excellent condition of both varieties of grapes made sorting unnecessary. Based on the results in Table I aqueous solutions of the effective chemicals were prepared. The contents of one or two lug boxes were dipped into a test solution, drained on stainless steel screens and repacked into the washed, dried and relined lug boxes. The dipping was carried out at 33 F to prevent a change in the fruit temperature. Untreated samples of grapes served as controls.

TABLE I—EFFECTIVE MOLD AND ROT INHIBITORS FOR EMPEROR GRAPES

Chemical Used	Treatments Giving Adequate Protection After Five Days at Room Temp. & High Relative Humity
Roccal	10,000 ppm
Roccal	20,000
Sodium propionate*	10,000
Dowicide C*	1,200
Dowicide C*	800
Phygon*	100

*1,000 ppm Aresket added as wetting agent.

Following repacking the grapes were stored at 32.5 F ± 1 F and 80-90 percent relative humidity. A special plywood cabinet was constructed for storing the grapes which allowed the experimental pack to be isolated from other products in the storage room.

Germicidal Dips Plus Overwrapping

A parallel series of treatments by dipping into aqueous chemical solutions was set up which included an overwrap to protect the grapes during storage. Again, one or two lugs per test chemical were treated as described above, except that an inner wrap of plastic film was placed into the lug boxes before the grapes were added. Then the grapes were sealed into the inner wrap and the lug fastened down.

On the basis of a previous prepackaging study with berries it was considered best to use a low moisture vapor transmission film as a wrap to prevent drying of the stems and shriveling of the fruit. A rubber hydrochloride film was selected. This wrap was modified with a small window of high gas transmission film, cellulose acetate, to prevent accumulation of carbon dioxide within the crate while retaining the benefits of high internal humidity and protection against re-infection from the surroundings. Wrapped samples of grapes without chemical treatment served as controls for this series.

SO_2 Gas Plus Overwrap

A third group of treatments consisted of maintaining a low gaseous SO_2 concentration among the grapes within the lug box. This was achieved by overwrapping the grapes after the addition of (1) five grams of potassium metabisulphite in the form of pellets wrapped in filter paper or (2) excelsior cushions impregnated with an equal amount of bisulphite, which were placed at the bottom of the lug boxes.

Here again the overwrap consisted of the low moisture vapor transmission rubber hydrochloride film supplemented by a cellulose acetate window of high gas transmission. This window served not only to prevent a high accumulation of CO_2 but also to control the partial pressure of SO_2 within the crate while maintaining a high internal humidity.

Storage

Storage was maintained at 32.5 to 1 F and 80-90 percent rel hum for fourteen weeks after which time the untreated commercially packed samples which served as controls appeared to be at least 50 percent unsaleable.

Evaluation

When it became evident that the control samples were considerably molded the entire lot was examined for the extent of mold, general appearance and flavor of the fruit. The extent of mold was determined by separating into three groups the bunches of grapes considered moldy, slightly moldy or not moldy. The weight of bunches in each group was then recorded for each lug as it was inspected.

While it was impossible to assign a clear-cut borderline between slight and heavy mold an attempt was made on the following basis. Light mold was that which could be eliminated by the removal of a few berries in the bunch or which did not spoil the fruit proper. More than that amount was rated as heavy mold.

The appraisal of general appearance included the color and dryness of the stems, presence of natural bloom and color and firmness of the berries. It did not include the presence of mold since this was evaluated separately. Flavor of the fruit was judged also. It was tasted by the investigators at the time the lugs were opened and inspected. This tasting was performed with the object of detecting the presence of pronounced foreign flavors. The possibility is recognized, however, that slight flavor changes might have missed detection.

The effectiveness of the treatments was determined by ranking each treatment on the basis of the percent saleable produce. This figured was calculated from the weight of the no-mold/ total weight fraction of each crate. Table II shows the treatment rank and percent saleable material for Emperor grapes while Table III reports the results for the Almeria variety.

Several of the treatments were found to be definitely better than the controls. The grapes in which a constant SO_2 level was maintained by the addition of metabisulphite and overwrapping were of very good quality. On the other hand, the fruit which was packed in the conventional manner, that is with a metabisulphite cushion and no overwrap, were in very poor condition and completely unsaleable. Among the germicidal dips Dowicide C produced the best

TABLE II—RESULTS OF MOLD INHIBITION STUDY ON EMPEROR GRAPES AFTER 14 WEEKS AT 33 F

Chemical	Concentration	Wrapped*	Rank	% Saleable Weight	Condition
$K_2S_2O_5$ cushion	5g/crate	yes	1	66.7	Excellent
$K_2S_2O_5$ pellets	5g/crate	yes	2	38.3	Good
Dowicide C (pH = 8)	1000 ppm	no	3	29.0	Fair; some brown stems, no bloom
Roccal	2%	yes	4	19.5	Fair-poor; some fruit soft, no bloom
Roccal	2%	no	5	17.4	Fair-poor; some brown and dry stems, no bloom
Phygon	100 ppm	no	6	16.3	Fair-poor; some brown and dry stems, no bloom
Roccal	1%	no	7	7.8	Poor; mostly brown and dry stems, trace of bloom
Sodium propionate	1%	no	8	1.3	Very poor; brown and dry stems, soft fruit
Sodium propionate	1%	yes	10.5	0.0	Very poor
$K_2S_2O_5$ cushion	5g/crate	no	10.5	0.0	Very poor
None		yes	10.5	0.0	Very poor
None		no	10.5	0.0	Very poor

*Wrapped in sealed rubber hydrochloride film containing a small cellulose acetate window.

TABLE III—RESULTS OF MOLD INHIBITION STUDY OF ALMERIA GRAPES AFTER 14 WEEKS OF COLD STORAGE (UNWRAPPED)

Chemical	Concentration	Rank	Percent Saleable	Condition
Dowicide C pH=8	1,000	1	36.4	Fair to good, mostly dry and brown stems, some bloom, firm fruit
Phygon	100	2	33.0	Fair, very dry and brown stems, good bloom
Roccal	20,000	3	19.1	Very poor, brown spots on fruit due to treatment
Sodium propionate	10,000	4½	0.0	V. poor, dry and brown stems, some soft fruit
Controls	.....	4½	0.0	V. poor, dry and brown stems, some soft fruit

results although the condition of the fruit was not as good as that which had received SO_2 gas plus an overwrap. Fig. 1 illustrates the results of including an overwrap to the metabisulphite cushion as a treatment for preventing mold in storage for Emperor grapes. In Fig. 2 is shown the distribution of mold in one lug of Emperor grapes from the lot representing the commercial method of storing grapes—i.e. packing without overwrapping but including a metabisulphite impregnated cushion in the bottom of the crate. Fig. 3 illustrates the effect of overwrapping without any chemical treatment to the grapes.

In the experiments with Almeria grapes in which only the effect of chemical treatment was studied the results were very similar to those obtained with the Emperor grapes. Here the Phygon treatment as well as the Dowicide C treatment resulted in fruit with fair quality and approximately 35% saleable material. Roccal and sodium propionate treatments were not satisfactory and the controls were completely unsaleable and very poor quality. See Table III.

Summary

An attempt was made to improve the cold storage characteristics of Emperor and Almeria grapes by reducing microbiological spoilage. Germicidal dips were used to reduce field contamination carried into storage, overwrapping was tried to eliminate storage contamination and overwrapping plus potassium metabisulphite was employed in an effort to maintain an active germicidal condition throughout storage. The treatments were compared with lugs of commercial grapes stored without any treatment and with grapes stored with the conventional metabisulphite impregnated excelsior cushions in the bottom of the lug boxes.

Overwrapping coupled with the maintenance of a very low partial pressure of SO_2 within the package gave the most promising results. Both commercial cushions and metabisulphite pellets were acceptable as a source of SO_2. Cushions without overwrapping as practiced commercially represented no significant improvement in the quality of the grapes over the untreated controls after 14 weeks storage. Among the aqueous dips the 1000 ppm Dowicide C treatment was superior and ranked second to the overwrapped samples containing SO_2.

On the basis of these experiments it was recommended that larger scale field tests be run in which many lugs of grapes be used to confirm the data obtained here where only two lugs were used for most treatments. It was recommended that the most promising treatments, that is — five grams of metabisulphite added to the grapes and overwrapped with a rubber hydrochloride film containing a small cellulose acetate window, and dipping into a solution of 1000 ppm Dowicide C at a pH of 8 before storage, be tested on a large scale together with untreated and commercially treated Emperor and Almeria grapes. In future tests it is desirable that the results be evaluated statistically from the standpoint of mold development, flavor, appearance and salability.

Fig. 1—Distribution of mold in a lug of Emperor grapes treated with Metabisulphite, overwrapped and stored 14 weeks at 33 F

Fig. 2—Distribution of mold in a lug of Emperor grapes treated with Metabisulphite, not wrapped and stored 14 weeks at 33 F

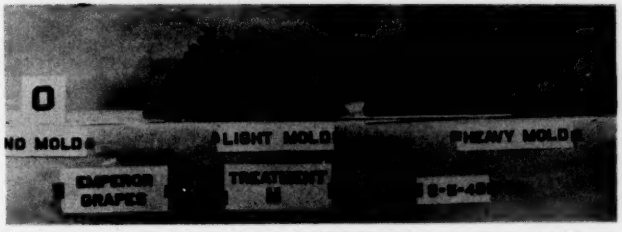


Fig. 3—Distribution of mold in a lug of Emperor grapes treated by overwrapping with no chemical added and stored 14 weeks at 33 F

Certificate of Cooperation Presented to NARW

TECHNICAL assistance furnished by the National Association of Refrigerated Warehouses to peoples of the Marshall Plan Countries was recognized on April 3 in Washington when a Certificate of Cooperation was presented to NARW by the Economic Cooperation Administration.

William Dalton, Executive Vice President of the refrigerated warehousing trade group, received the award for his organization. John Russell Young, Chairman of the Board of Commissioners of the District of Columbia made the presentation in the name of William C. Foster, ECA Administrator.

The text of the citation read: "Certificate of Cooperation Awarded to the National Association of Refrigerated Warehouses for furnishing technical assistance to the Peoples of the Marshall Plan Countries to aid them in maintaining individual liberty, free institutions and peace."

Booklet Describes New Warehouse Storage

A 16-PAGE booklet has been issued by the Western Gateway Storage Co., Ogden, Utah, announcing the opening of a new refrigerated warehouse storage plant. It has been adapted, according to the announcement, to the modern demand for diversified warehousing and distribution. In text and pictures the various features and facilities of the plant are described, including an exterior view, loading docks, trackage, motorized equipment, milk turning machines, floor space, cooler and freezer rooms, engine room, heating plant, scientific safeguards, and modern office equipment.

Frane New Manager Hopkins Warehouse

THE appointment of John B. Frane as manager of Merchants Refrigerating Company's new warehouse at Hopkins, Minn., is announced by Arthur N. Otis, president. Mr. Frane is an experienced warehouseman having spent over twenty-five years in the industry, and is thoroughly familiar with all phases of warehousing. Until the new plant is completed, he will have a temporary office on the building site on West Lake Street and Monk Avenue, Hopkins, Minn.

New York City Plans Civilian Defense

UNINTERRUPTED distribution of food to the civilian population in the case of atomic attack is the number one aim of New York City's Civilian Defense program for the cold storage warehouses. Eighteen different committees in the food and distribution field have been set up by defense authorities to take over in the event of atomic bombardment. Each of the committees is planning establishment of alternate locations from which they may operate to direct emergency distribution of food.

The Cold Storage Committee has been assigned the task of working out a procedure whereby merchandise could be quickly re-routed to undamaged warehouses in the event of an enemy bomb attack. The Committee would also be given the job of organizing the rehabilitation of damaged warehouses.

New York City's Department of Markets is setting up control centers to be used as dispatch and re-organization points in time of disaster. Each of the food distribution committees will be represented in the control centers to help coordinate feeding of the city's population.

Cooke Joins Task Group DTA

J. LEO COOKE, president of the J. Leo Cooke Warehouse Corporation, Jersey City, N. J., and general president of the American Warehousemen's Association, has been invited by J. K. Knudson, Administrator of the Defense Transport Administration to serve on the Task Group for Warehousing and Storage, under the office of Defense Transport Administration.

The National Security Research Board has an organization of a General Committee and five Task Groups to provide service and information in the nation's domestic transport system for use in mobilization and planning.

The general chairman of the Committee on Domestic Transport and Storage is Col. J. Monroe Johnson, who has subdivided his work into five Task Groups. The Task Group having to do with warehousing and Storage is under the direction of Col. Leo N. Nicholson. Harold K. Osgood, director of Warehousing and Storage Division of the Defense Transport Administration is also a member of this Task Group Committee and is secretary of that committee.

Frozen Fruits and Vegetables in Storage

APPROXIMATELY three fourths of the total stocks of frozen peaches in storage February 28 were classified by warehousemen as to container size. Of the 12 million pounds classified 19 percent were reported to be in packages of one pound or less.

COLD STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN PACKAGES OF ONE POUND OR LESS IN STORAGE JAN. 31 AND FEB. 28, 1951 (000 lbs.)

	February 28, 1951		January 30, 1951	
	Lbs.	%	Lbs.	%
Peaches	2,293	19	2,746	23
Raspberries	5,038	28	5,504	26
Strawberries	23,195	38	28,884	42
Asparagus	3,262	75	3,957	76
Beans, lima	19,581	64	22,833	63
Beans, snap	14,051	69	16,138	69
Corn, sweet	9,440	52	12,008	54
Peas, green	32,446	66	38,112	66
Spinach	5,809	73	7,347	76

This ratio of retail to institutional packages was the lowest reported since August 1947 when packaging data was first collected. A year ago this time peaches in retail containers were 46 percent of the classified stocks and this ratio was only one-point below the highest ratio reported (September 30, 1949).

Coverage of both strawberries and raspberries amounted to 79 percent of total stocks. The percentage of strawberries in retail packages was down 4 points since January 31, to 38 percent, while an increase of 2 points since last month brought the ratio of raspberries in consumer packages to 28 percent.

Stocks of the six frozen vegetables in storage February 28 totaled 207 million pounds, 63 percent of this amount classified according to package size. This compares with a coverage of 64 percent a month earlier and 60 percent last year.

For the first time since April 30, 1949 less than three fourths of classified spinach stocks were in retail containers. The 73 percent reported in this type container on February 28 compares with 76 percent a month previous and 78 percent on February 28, 1950.

Corn and asparagus in retail packages showed decreases of 2 points and 1 point respectively since January 31 while the portions of snap beans and peas in this type container remained the same. Lima beans increased 1 percentage point.

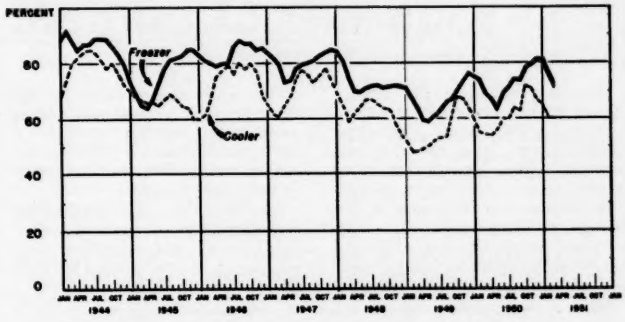
March 31 Cold Storage Holdings

THERE was no change since last month in the percentage of public cooler space utilization. The occupancy of 60 percent of cooler space on March 31 was 6 points above that of a year ago and 2 points above average for this time of year. Increases in cooler occupancy were reported for the West North Central, East South Central, West South Central, and Mountain regions.

A decrease of 4 percentage points during March lowered freezer occupancy to 72 percent. This compares with freezer utilization of 69 percent a year ago and average March 31 occupancy of 74 percent. The percentage of occupied freezer space in the West North Central region remained the same as last month while decreased utilization was reported for the remaining regions. Indiana and Georgia led all other states in the amount of freezer space being used with 94 percent occupancy reported for each of these states.

Cooler and freezer weights on March 31 were almost evenly divided with approximately 1.7 billion pounds of foodstuffs being held in each type of storage. The combined cooler and freezer weight of 3.4 billion pounds reflects a 12 percent decrease in the weight reported for February 28. This compares with an 11 percent reduction a year ago this time. There was a net withdrawal of 364 million pounds of cooler commodities during March as fresh apples and pears, cheese, dried eggs, beef, pork, and lard and pork fat moved out of storage. Net withdrawals of freezer items, except cream, frozen eggs, pork and sausage, resulted in a net reduction of 131 million pounds in freezer weight during March.

Seasonal declines of fresh apples and pears left 13 million and 313 thousand bushels, respectively, in storage on March 31. This compares with 7 million bushels of apples in storage this time of year for the 5-year period ended 1950 and 261 thousand bushels of pears during the comparable average period. Net withdrawals of apples were better than average during March and about average for pears.



Occupancy of public refrigerated warehouses, 1944-1951

During March storage holdings of dried and evaporated fruits, canned fruits and vegetables, potatoes, celery, nutmeats, and peanuts in shell showed seasonal gains as compared with net decreases in stocks of onions and nuts in shell.

With the exception of orange concentrate and other fruit juices and purees, national holdings of frozen fruit items were in lesser supply at the end of March than a month earlier. Total holdings of frozen fruits and juices amounted to 388 million pounds, of which 243 million pounds were frozen fruits. This time last year frozen fruits, exclusive of juices, totaled 178 million pounds and 258 million pounds were in store for the 5-year period ended March 31. Orange concentrate increased during March from 8 million gallons to almost 10 million gallons.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC, PRIVATE AND SEMI-PRIVATE WAREHOUSES, APPLE HOUSES AND MEAT PACKING PLANTS (000 LBS.)

	March 31, 1951	Feb. 28 1951	March 31, 1950	Five-year Average
Meat and meat products, lbs.	898,571	917,774	778,415	804,812
Lard and rendered pork fat, lbs.	79,314	89,433	87,306	112,562
Frozen poultry, lbs.	193,378	242,023	212,058	217,809
Creamery butter, lbs.	32,098	52,507	93,489	25,206
American cheese, lbs.	130,420	137,397	141,946	96,840
Other cheese, lbs.	18,719	17,798	13,506	14,017
Shell eggs, cases	320	159	1,296	1,454
Frozen eggs, lbs.	60,068	32,712	116,546	117,110
Apples, bu.	12,882	20,135	7,074	6,785
Frozen fruits, lbs.	387,667	408,361	251,119	297,649
Frozen vegetables, lbs.	293,151	328,520	269,980	219,233
Frozen fish, lbs.	96,362	106,834	87,133	81,821

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 cu. ft.)		March 31, 1951 (%)		Feb. 28, 1951 (%)		March 31, 1950 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,058	5,596	53	68	58	84	43	68	53	60
Middle Atlantic	35,635	29,846	53	74	60	76	44	65	53	74
East North Central	26,206	24,328	60	75	66	80	61	71	60	75
West North Central	9,843	15,480	66	80	62	84	77	82	66	80
South Atlantic	9,300	6,585	62	80	53	80	56	72	62	80
East South Central	2,822	3,252	72	76	63	78	70	81	72	76
West South Central	7,249	7,301	67	70	58	61	58	59	67	70
Mountain	1,561	2,301	72	82	64	73	74	72	72	82
Pacific	14,011	20,866	53	65	55	66	46	64	53	65
United States	109,685	115,555	58	74	60	76	54	69	58	74

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRIVATE AND SEMI-PRIVATE REFRIGERATED WAREHOUSES AND MEAT PACKING PLANTS (APPLE HOUSES EXCLUDED)

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent				Net Piling Space (000 Cu. Ft.)		Space Occupied			
			March 31, 1951		Feb. 28, 1951				March 31, 1951		Feb. 28, 1951	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	116	36	87	78	66	74	61	.....	70	.....	77	.....
Middle Atlantic	1,346	1,714	46	80	50	81	1,512	270	87	88	84	87
East North Central	6,234	5,660	59	74	59	69	4,136	1,184	87	88	89	89
West North Central	573	2,402	86	75	88	79	14,119	6,513	90	90	91	90
South Atlantic	482	2,602	68	73	69	74	962	239	86	99	87	100
East South Central	.....	.....	.....	.....	.....	.....	341	110	93	88	90	90
West South Central	307	203	71	59	82	45	1,199	500	100	100	93	87
Mountain	104	6	93	.....	93	.....	767	437	91	98	89	99
Pacific	2,927	3,897	21	51	31	61	2,723	522	92	93	97	96
United States	12,089	16,520	51	69	52	71	25,820	9,775	90	91	91	91

NOTE: Blank spaces indicate that insufficient returns were received.

Frozen vegetables in storage March 31 amounted to 293 million pounds as compared with 270 million pounds in store a year ago. Net withdrawals during the month were greater than average, 35 vs. 24 million pounds, but were equal to the change of last year.

During March more than 20 million pounds of butter moved from storage leaving 32 million on hand. This net withdrawal was almost equal to the record March 1944 withdrawal (26 million pounds) and was only 2 million pounds less than the next greatest March decrease (1934).

Shell egg inventories more than doubled during March as an inmovement of 161 thousand cases brought national holdings to 320 thousand cases. This compares with almost 1.3 million cases in store last year and 1.5 million cases, the average March 31 stocks. Frozen eggs, likewise, reflected seasonal gains. A net increase of 27 million pounds—the average increase was 28, last year it was 43 million pounds—brought total holdings to 60 million pounds which was about half the March 31 average holdings and those of last year.

Reduction of American Cheddar cheese holdings during March of 7 million pounds left 130 million on hand by the end of the month. This plus other cheeses in store on March 31 totaled 155 million pounds.

All poultry items reflected seasonal decreases during March as a net total of 49 million pounds moved from storage. The 193 million pounds on hand March 31 compares with 212 million a year ago and 218 million on hand March 31 for the 5-year period ended 1950. Turkey stocks were down 19 million pounds to 82 million while fowls in storage were reduced to 41 million pounds.

Total meats in storage March 31 amounted to 889 million pounds as net withdrawals of 19 million pounds took place during March. A year ago total meats amounted to 778 million pounds while average stocks for this time of year totaled 805 million pounds. Beef holdings were down 16 million pounds from a month earlier, and on March 31 amounted to 133 million pounds.

Less than average withdrawals and those of a year ago reduced total pork stocks to 638 million pounds. This compares with average holdings of 518 million pounds and March 31, 1950 stocks of 549 million. Sausage and sausage room products totaled 16 million pounds; lamb and mutton, 8 million; veal 8 million; edible offal, 54 million pounds. Stocks of lamb and mutton, veal and edible offal were below average.

March 31 storage stocks of fishery products were down 10 million pounds from a month earlier and totaled 96 million pounds. Cured fishery products amounted to 8 million pounds as compared with 17 million pounds in storage last month.

Storage Outlook

Public cooler utilization during March leveled off at the occupancy reported a month earlier, which was in accordance with the pattern prevailing during the 5 year period ended 1950. The occupancy level of March 31 should mark the end of the downward cycle as, from previous performance, utilization of cooler space generally increases during April.

Normally, a 3 point increase can be expected but thus far the net into storage movement of shell eggs has been below average which may keep occupancy at a level lower than expected. Freezer utilization dropped faster than expected during March. The monthly occupancy level should continue to fall as frozen fruits, vegetables, butter, and poultry move from storage. According to the 5 year average pattern, a drop of 4 points could be expected although last year this time public freezer occupancy declined by 2 points only.

Summary of Regional Cold Storage Holdings

THE fifth in a series of yearly summaries of regional cold storage holdings has been issued by the Production and Marketing Administration of the U. S. Department of Agriculture. Monthly stocks of various commodities are listed by nine geographic regions and monthly holdings of dairy and poultry products by states. The purpose in compiling the twelve monthly cold storage reports into a monthly summary is to provide a ready reference for those interested in holdings of foodstuffs in refrigerated warehouses in the United States.

Data for this report were collected from public, private and semi-private warehouses, apple houses and meat packing plants. Commodities in space owned or leased and operated by the Armed Services were not reported. An early report on these holdings was published in the January issue of ICE AND REFRIGERATION compiled from the monthly reports.

Canadian Holdings of Fruits and Vegetables

THE Dominion Bureau of Statistics of Canada, Agricultural Branch, reports the following commodities held in cold storage on March 1, 1951.

Apples in cold storage on March 1, 1951 amounted to 3,114,000 bushels compared with 4,511,000 bushels February 1, 1951 and 2,558,000 bushels March 1, 1950.

Frozen fruit holdings in storages and factories March 1, 1951 amounted to 12,804,000 pounds as compared with 14,704,000 pounds February 1, 1951 and 12,089,000 pounds March 1, 1950.

Stocks of frozen vegetables in storages and factories on March 1, 1951 amounted to 10,406,000 pounds as compared with 11,372,000 pounds February 1, 1951 and 5,838,000 pounds March 1, 1950.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

H. P. Branham, Pocatello, Idaho
Sergeant-at-Arms, National Association Practical Refrigerating Engineers

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High Vacuum Pre-Cooling Method for Produce

HAROLD P. HAYES
Head, Mechanical Engineering Dept., University of Santa Clara, Santa Clara, Calif.

ONE of the principal problems confronting the shipper of fruits and vegetables has been that of adequate refrigeration of the produce during transit. This problem has generally been analyzed in two steps:

1—Removal of the field heat and heat of respiration of the produce before shipping.

2—Holding satisfactory produce temperature in transit.

Until recently, the methods of pre-cooling could be summarized as:

1—Car pre-cooling.

2—House pre-cooling.

3—Immersion, or Hydrocooling.

4—Top icing.

Now a fifth method can be added which holds great promise of widespread adoption in the future, high vacuum cooling. Basically, the product which is to be pre-cooled is exposed to a high vacuum which causes some of the water in the vegetable to be vaporized. The heat of vaporization of the water is taken from the body of the vegetable itself, resulting in an evaporative cooling action. The amount of cooling obtained is governed by the degree of vacuum to which the vegetable is exposed.

Application of Vacuum Cooling

It is the purpose of this paper to discuss the following principal considerations in the application of vacuum cooling as applied primarily to the pre-cooling of fruits and vegetables:

1—The basic engineering principles involved.

2—The application of these basic principles to a commercial layout for cooling lettuce.

3—Its present commercial status and its future possibilities.

NOTE: The author expresses appreciation to A. Harder of the Vacuum Cooling Company of Salinas, Calif., and to the members of the San Jose Chapter N.A.P.R.E. for their help in making this paper possible.

Presented at the 41st NAPRE Convention.

To consider the first of these points, what are the basic principles underlying vacuum cooling? It is a commonly known fact that the boiling temperature of water decreases as the pressure to which the water is exposed is lowered. This fact is illustrated in Table I, which shows the boiling temperatures corresponding to certain absolute pressures. For example, at 29.74 in. Hg. vacuum on a day when the atmospheric pressure is 29.92 in. Hg, water boils at 32 F. Table I also indicates that at such a high vacuum, 1075.8 Btu must be supplied per pound of water evaporated.

Suppose that a head of lettuce (which contains a high percentage of water) is placed in a chamber. Suppose the lettuce is at 65 F. and the chamber is at 29.92 in. Hg. absolute, or atmospheric pressure. As the pressure in the chamber is reduced to 3.45 in. Hg. absolute (26.47 in. Hg. vacuum) there will be only a slight cooling action, because the boiling point corresponding to this pressure is 120 F. However, as the pressure is lowered to 0.52 in. Hg. absolute (29.4 in. Hg. vacuum) the water in the lettuce must start to boil because the boiling temperature corresponding to this pressure is 60 F.

Since heat is required for this boiling or vaporization, the necessary heat is taken from the only source of heat available, the lettuce itself. Thus the lettuce will cool until an equilibrium condition is reached at 60 F. If the pressure is lowered, further cooling will take place, and so on, until any desired temperature can be obtained. Moreover, there is very little time lag between the cooling effect and the drawing of the vacuum. The really significant limit to the rate

TABLE I—PROPERTIES OF WATER FOR BAROMETRIC PRESSURE OF 29.92 IN MERCURY

Saturation Temperature F	Absolute Pressure psia	Vacuum Inches Mercury	Heat of Vaporization Btu/lb.	Volume of Sat. Vapor cu. ft./lb.
32	0.089	29.74	1075.8	3306
40	0.122	29.67	1071.3	2444
60	0.256	29.40	1059.9	1207
80	0.507	28.89	1048.6	633
100	0.949	27.99	1037.2	350
120	1.692	26.47	1025.8	203
140	2.889	24.04	1014.1	123

of cooling is the rate at which the vacuum can be produced.

Thus, the actually difficult part of the theory of vacuum cooling is the manner in which a high vacuum can be produced. Although this can be done in several different ways, the methods which seem best for application to the large scale vacuum cooling of produce is the steam jet system. The operation of such a system is illustrated schematically in Fig. I.

Steam at about 90 psi gage is supplied to the nozzles of the booster compressor. The booster compressor is simply a nozzle in reverse so that high velocity steam entering the booster is converted to static pressure. This high velocity steam meanwhile entrains air or vapors from the chamber to be evacuated and discharges the entire mixture to the booster condenser. Actually the mixture could be discharged directly to the atmosphere except that too much water would be wasted (in the form of steam) and booster compressors are very inefficient above pressure ratios of 10 to 1.

Thus for purposes of economy, steam jet systems are constructed in stages, and with condensers, as shown. The steam from the nozzles in the booster compressor and the water vapor from the vacuum chamber are condensed in the booster condenser. All non-condensable gases which collect in the booster condenser are removed by means of the primary air ejector which is very similar to the booster compressor, except that it is smaller. The steam supplied to the primary air ejector is condensed in the inter-condenser. All the non-condensable gases pumped by the booster compressor and the primary air ejector are discharged to the atmosphere by means of the secondary air ejector which is similar to the primary ejector.

The steam supplied to the nozzles of the secondary ejector is discharged to the hot well in the system shown (for noise silencing) although another condenser called the after-condenser is sometimes used. The system shown in Fig. I is a three stage application. As a general rule of thumb, pressures below 0.25 psi absolute (29.4 in. Hg. vacuum) require a three stage, condensing, system. Since the pressures used in vacuum cooling of produce are about 0.10 psi absolute, Fig. I meets the requirements for a typical steam jet application to vacuum cooling.

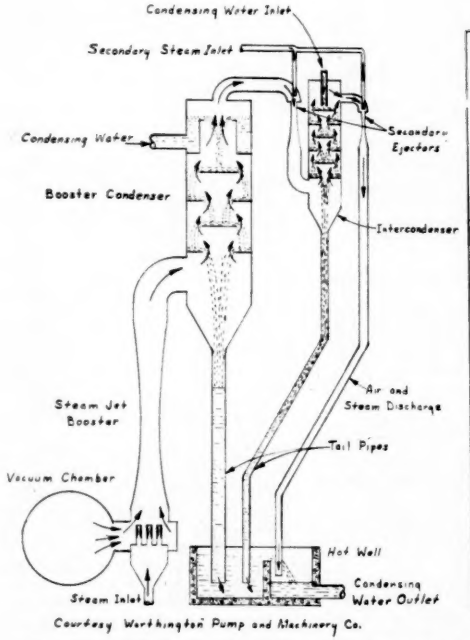


Fig. 1—Details of the steam jet operated vacuum cooling system

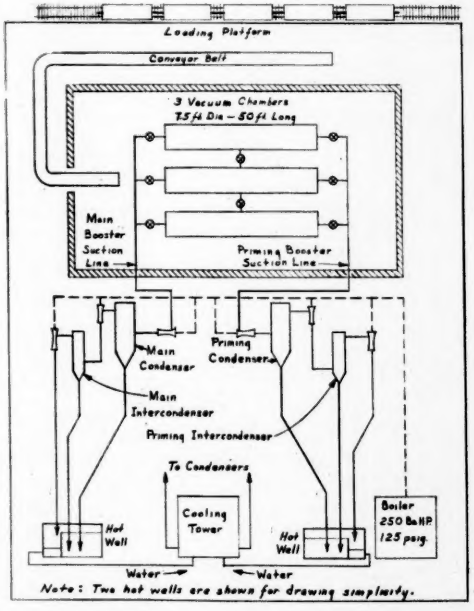


Fig. 2—Layout of the high vacuum cooling plant above, with schematic diagram of the vacuum system below

Applying Principles to Commercial Layout

To consider the second of the three main points of discussion, how can the fundamental principles be applied to a commercial layout for vacuum cooling? The Vacuum Cooling Company has answered this question with a well designed plant in Watsonville, Calif., used at present for cooling lettuce. Fig. 2 shows a schematic layout of the plant. Subsequent figures will picture the actual plant itself.

As shown in Fig. 2, the lettuce to be cooled is placed in one of the three chambers which are 7½ feet in diameter and 50 feet long. The present method of operation is to unload from one chamber while priming a second and cooling a third. The vacuum is produced in three steps. At approximately one-half hour intervals, the following events occur:

1—The chamber which is ready to be unloaded is cross connected to that in which priming is to begin. The equalization of pressure between the two chambers reduces the pressure in the chambers to about 15 in. Hg. vacuum.

2—The priming steam jet system, which is entirely separate from the high vacuum system is then placed in operation to obtain about 28 in. Hg. vacuum.

3—When a 28 in. Hg. vacuum is obtained, the priming stage is closed off and the high vacuum booster system is opened. This increases the vacuum to 29.7 in. Hg., a value which is held for about 20-25 minutes to cool the lettuce to 32 F.

The length of time the high vacuum is held depends upon the indication given by thermocouples placed between heads of lettuce in the crates. Thus if the vacuum should increase to 29.8 in. Hg. or more, there is no danger of freezing the lettuce because the operator stops the cooling process when the lettuce reaches 32 F. A vacuum higher than 29.7, therefore, merely increases the rate of cooling. A vacuum which falls below 29.6 or 29.5 in. Hg. indicates trouble in the system and the operator secures the plant until the difficulty is located and corrected. Thus the control is on "on-off" rather than a modulated control.

When the lettuce has been cooled to 32 F., the chamber is cross connected to the next chamber ready for priming, and the entire process is repeated.

As can be seen from Fig. 2, the entire operation is conducted by means of a 250 boiler horsepower steam generator, a correspondingly sized vacuum system, and a cooling tower of about 1,000,000 Btu hr. capacity. This, of course, represents very little equipment to accomplish the cooling of 600 crates of lettuce per hour.

Pictures Show Equipment

As usual, the schematic diagram looks very little like the actual plant layout, so Figs. 3-10 were prepared to give some idea of the actual equipment involved.

Fig. 3 shows the oil fired, fire-tube boiler, 125 psi steam pressure, 250 horsepower capacity. The oil storage tank can be seen in the background.

Fig. 4 shows the cooling tower, which is a forced draft, redwood tower of about 1,000,000 Btu hr. capacity.

Fig. 5 shows the vacuum chambers which are 7½ feet in diameter and 50 feet long. They are of welded construction.

Fig. 6 shows the manifold for the pneumatic control system. The valves which connect the chambers to the exhaust lines are pneumatically operated, as are the doors to the chambers.

Fig. 4 also shows the booster compressors of the three stage high vacuum system. These are operated in parallel. The priming booster compressor cannot be seen but it is similar to the main booster, and part of a three-stage, condensing, system also. Steam flows into these compressors, picks up air and water vapor from the vacuum chambers and the mixture is carried to the priming or main barometric condensers, as the case may be.

Fig. 7 shows the priming barometric condenser and the main barometric condenser, which are of the standard type: The mixture of air, water, vapor, and steam enters the condensers and comes into direct contact with cooling water from the cooling tower. The condensate flows down to a hot well while the non-condensable gases are ejected by means of the primary and secondary steam jets with an inter-condenser.

Figs. 8, 9, and 10 give a good picture of the flow of materials through the entire operation. Lettuce previously packed into crates is loaded onto a special small, flat car which holds 198 crates (there are about four dozen heads of lettuce per crate). This flat car is pushed into the chamber at one end, the lettuce is cooled, and the car is pulled out at the other end of the chamber. The crates are then manually lifted onto a conveyor belt and carried to box cars which have been iced and are ready to take the lettuce.

NAPRE Department

Advantages and Disadvantages

To consider the last of the three main considerations proposed earlier, how good is the method of vacuum cooling at present and what promise does it hold for the future?

The principal advantage of vacuum cooling is that it is very economical.* Cost figures are dangerous to quote because they are subject to appreciable changes. However, within recent months, when it cost $1.85-$2.00 per crate to ice-pack lettuce, it could be dry packed for $1.05-$1.25 per crate and vacuum cooled for an additional $0.25 per crate, or a total of $1.30-$1.50 per crate. Thus the vacuum cooling method provided a saving of $0.35-$0.70 per crate.

Moreover, cardboard cartons can be used instead of wooden crates when vacuum cooling is employed, offering an additional saving equivalent to $0.30 per crate, over and above the saving previously mentioned. Lettuce has actually been packed, vacuum cooled, and shipped out of the Watsonville plant in cardboard cartons. Aside from the saving in cost, the entire operation is cleaner and generally more convenient than the more common method of ice packing in wooden crates.

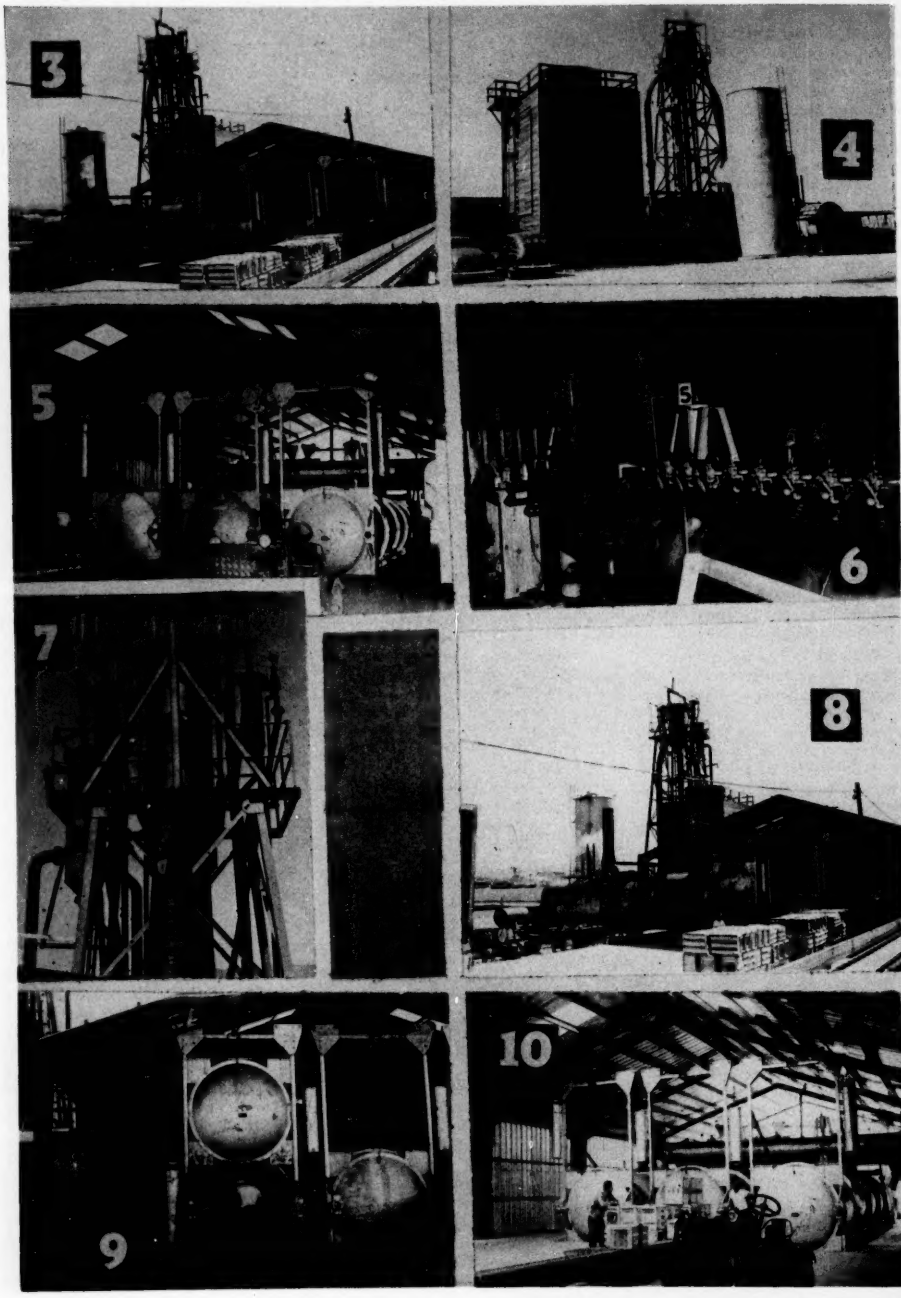
The principal disadvantage of the vacuum cooling process is that it is new. In other words a great many questions can be asked about the process for which there are no exact answers. As a result there is a tendency to be wary of the process until it has completely proved itself.

For example does the evaporation of moisture from the lettuce dry it out to such an extent that the quality of the lettuce is impaired? Probably not inasmuch as only about three or four percent moisture is removed. Actually the leaves appear fresh and crisp and it is possible that the lettuce is somewhat improved in quality. Such a question however is controversial and not completely answered as yet.

Other similar questions can be asked. Is there any guarantee that cooling will be uniform throughout the vacuum chamber? Isn't there some danger of freezing the outer leaves of the lettuce? Again the answers must be that to date no serious troubles have been experienced. These are things which only time can prove conclusively so that some wariness is justifiable. However lettuce is now being cooled on a commercial

*Cost figures were provided by the Vacuum Cooling Company, Salinas, Calif.

Views of Steam Jet Operated Vacuum Cooling System Showing Equipment Involved



scale by the vacuum process and competing very profitably with lettuce cooled in a more conventional manner.

Probably the best question of all is "Can the vacuum cooling process be applied to fruits and vegetables other than lettuce?" To date not very much information is available on this subject. Some experiments have been conducted on tomatoes, oranges, lettuce, celery, asparagus, spinach and corn with good success. The general results of these tests would seem to indicate that all of these substances can be effectively cooled by the vacuum method although leafy vegetables respond more readily to vacuum cooling than do more solid fruits and vegetables.

Tomatoes, for example, present a problem if the vacuum is produced too suddenly for the vaporized water to pass through the skin. Obviously this could lead to a relatively high internal pressure and the danger of tissue injury due to bursting. In practically all of the tests to date, however, there has been no apparent loss in quality of the fruits or vegetables cooled by the vacuum process.

Additional tests have been conducted investigating the application of vacuum cooling to pre-packaged produce. Spinach for example has been packed in cellophane bags and then cooled by the vacuum process. The principal difficulty encountered was the bursting of the bags, by the internal pressure developed, as was the case with the bursting tomatoes. The answer to the bursting bag problem was simply to perforate the bags and reduce the rate at which the vacuum was produced. With continued experimentation, the application of vacuum cooling to pre-packaged produce may well become an outstanding development in the food industry.

Summary

In summary, this paper has covered the theory of vacuum cooling, a description of a commercial layout for vacuum cooling, and a brief discussion of the merits and developments of this process. At present, the process is being successfully used commercially, as a substitute for ice packing. In some instances a reduced amount of top ice has been used. In other instances, the top ice has been entirely eliminated.

The extent to which the process will be used in the future depends to a large extent upon the investigations now being conducted with many fruits and vegetables other than lettuce. It appears that the process will soon be applied to leafy vegetables, or those with a relatively large surface area for a small volume. Great promise also exists for the application of this process to the cooling of pre-packed fruits and vegetables. It is the author's firm conviction that the vacuum cooling process will prove to be an outstanding contribution in the field of produce cooling.

N A P R E Question Box

H. G. Venemann, Professor of Refrigeration, Purdue University and chairman of NAPRE Educational Committee, answers members operating problems monthly in this column. Send questions to Chairman H. G. Venemann c/o Purdue University, West Lafayette, Indiana.

Ice Water Treatment

Question No. 880: Our plant is not heated in winter and our water treatment equipment is not effective under these conditions. It is a lime-alum water treating system. What is the function of sodium aluminate in ice water treatment? Would sodium aluminate give better results under the conditions described?—J. N.

ANSWER: In order to obtain an authentic answer to this question I went to headquarters and received a very clear explanation from R. S. Wise, Director of Technical Service, Cooling Water Division of the National Aluminate Corporation, Chicago, Illinois. We are indebted to Mr. Wise for this explanation which will be of interest to many of our members.

The common treatment used for removal of calcium and carbonate is treatment with lime in a precipitation type softener. The reaction between lime and calcium bicarbonate produces insoluble calcium carbonate and clear water is decanted continuously or intermittently from the top of the softener. Filtration of the water from the softener or lime treater may or may not be practiced. The use of a filter at this point is unnecessary if clear water can always be obtained from the softener without filtration.

Two difficulties arise in the application of this lime treatment process using lime alone. The first difficulty is that precipitated calcium carbonate forms a very fine particle which does not settle rapidly and tends to give carryover of suspended solids

from the softener. Even with a filter such carryover is undesirable since it would tend to plug the filter bed. The second difficulty is that since this is a chemical reaction and since all chemical reactions take a finite time for completion, we do not reach equilibrium in the average retention time provided in the softener. This means that we have an unstable water higher in calcium and carbonate contents than we would desire coming from the softener.

We are now ready for the question of the sodium aluminate usage. Sodium aluminate is prescribed to correct the two difficulties mentioned in the last paragraph. As an alkaline coagulant the sodium aluminate gives a hydrous alumina floc which gathers the fine calcium carbonate particles into a large snowflake appearing particle which settles rapidly and which therefore permits clear water in the effluent from the softener.

In addition to its coagulation function, the sodium aluminate also acts as an accelerator of the chemical precipitation of calcium carbonate so that the effluent calcium and carbonate contents when using sodium aluminate are definitely lower than when sodium aluminate is not used. The mechanism by which this acceleration is accomplished has been the subject for some technical discussion. Probably the most accepted theory on this subject is that this acceleration is due to the improved "seed" established by the coagulation. In other words, proper seeding of any supersaturated solution should accelerate the precipitation of the supersaturated components. Without sodium aluminate proper seeding is not obtained whereas with sodium aluminate proper seeding is produced.

In summary, sodium aluminate has the dual function in the lime treatment of water for raw water ice of coagulating the precipitated calcium carbonate in the softener to prevent carryover of turbidity, and secondly to accelerate the reaction between the lime and the calcium bicarbonate of the raw water so that lower calcium and carbonate contents are permitted in the effluent. Both calcium and carbonate are objectionable in the raw water ice manufacture and therefore the advantages of sodium aluminate in reducing these values even lower than with lime treatment alone are self-evident.

NAPRE Department

Bleeder Condenser Corrosion

Question No. 881: The condensers in our plant are bleeder type, atmospheric design in which the hot discharge gas from the compressor goes through the bottom pipe which acts as a desuperheater. Then the gas passes on up to the top pipe in the stand. The temperature of our condensing water is 93-96 F and when it reaches the bottom pipe in the condenser stand it is relatively warm. The bottom pipe in all the condenser stands rusts out very quickly and we blame this on the high temperature.

We have tried to relieve this condition of rapid rusting by coating the bottom pipe with bituminous coating but it is not satisfactory. Have you any remedy to suggest for this problem?—S. N. S.

ANSWER: Counter current bleeder type condensers like yours have not proven very successful in this country and are considered obsolete. There is not much you can do to avoid scaling in the lower tubes without rebuilding the condensers. You could install a closed type superheat extractor in the discharge line between the compressors and the condensers. This would remove practically all of the super-heat from the ammonia gas which is the cause of the excessive scale and corrosion on the lower inlet pipes at the present time. If you decide to rebuild your condensers I suggest that you discharge into the upper pipe and drain the liquid off at the bottom pipe. Keep each stand to a maximum of 12 inches high.

Personally I do not know of any coating or paint that will prevent corrosion. Even the "Compound L" proposed by Mr. Boardman in the December 1950 issue of ICE AND REFRIGERATION is not recommended for atmospheric condenser applications by the Texaco Company that makes it.—H. G. Venemann.

ANSWER No. 2: The report that corrosion was greatly accelerated in the bottom pipe of a bleeder type atmospheric condenser is unusual. Sometimes scale troubles are a little more severe on the bottom pipe because the water is warmer there and drops a little more of its scaling solids. The latter, however, is rather unusual.

I suspect that the bottom pipes do not deteriorate more rapidly because the hot gas is passing through them. Any increased deterioration probably would result from a deficiency of water on the pipes. Perhaps the user isn't pumping enough water over the condensers. Also they may not have adequate splash strips between the pipes to keep the water from splashing off. Accumulations of algae and other deposits on the upper pipes sometimes cause the water to fall away and miss the pipes below. Thus the lower pipes may be covered infrequently with water so that warm, damp conditions increase corrosion.

It may appear that the pipes through which the hot gas enters would be considerably higher in temperature than the other pipes which condense liquid. Experience has shown that this is not true unless the flow of water over the pipes containing superheated gas is deficient. It is true that the superheated gas has a comparatively high temperature but the heat transfer coefficient from this gas to the inside of the pipe is much lower than the coefficient of heat transfer from the pipe to the water film on the outside. Therefore the outer surface of the pipe is kept cool by the water and does not warm up to a temperature appreciably above the other pipes which are condensing liquid ammonia.

Experience has shown that these so called counter-flow atmospheric condensers are actually less efficient than a straight through condenser where the hot gas enters at the top and the liquid drains off from the bottom pipe. I would suggest that the condenser under discussion be converted to straight line flow, gas into the top pipe and liquid out the bottom. At the same time steps should be taken to insure that all pipes have a good film of water over them at all times.—Emerson Brandt.

Volume and Relief Valve

Question No. 882: The formula given in Question No. 871 (February, page 46) for sizing a safety relief valve bases the capacity required on the diameter and length of the vessel to which it is attached. A receiver or surge drum would hold several times as much refrigerant as a shell-and-tube condenser of the same diameter and length because the water tubes take up so much volume. In this instance, it appears that the relief valve for the receiver should be much larger than for the condenser.

Would it not seem more logical and accurate to base relief valve capacity on the volume of refrigerant contained in the vessel being protected? —J. L. W.

ANSWER: In order that we might get an official interpretation of the code for sizing safety relief valves I sent this question to E. T. Benson, Chairman Interpretations Subcommittee of the Safety Code for Mechanical Refrigeration, B9.

"Would a shell and tube type ammonia condenser 30 inches in diameter by 18 feet long containing 85 two inch O.D. tubes require the same size safety relief valve as a liquid receiver of the same dimensions? In other words is the size of the safety valve dependent alone upon the volume of the vessel or upon the volume of the liquid to be contained in the vessel?"

In his reply Mr. Benson interpreted the code the same as I had interpreted it in my answer to Question No. 871, with the further comment, "no consideration is given to the internal volume being taken up by water tubes."

He further stated, "Your inquiry is being sent to the Subcommittee for further study and discussion at the next meeting which is on May 31, 1951. Since there is ample time for it, you or others may wish to forward a definite recommendation and a reworded paragraph for consideration by the Subcommittee."

This will give J. L. W. or any of us an opportunity to put up some argument in favor of basing the size of the safety valve upon the weight of refrigerant it will hold rather than upon the diameter and length of the shell. You will observe that the formula, $C = fDL$, does not express the flow rate, C, in terms of volume, but in terms of diameter times length. Volume would involve diameter squared times length times 0.7854. The formula in the code seems to be empirical rather than logical or scientific.—H.G.V.

Heat Exchangers

I am glad to see that two manufacturers of heat exchangers have replied to Question 873, and commented on the answer which I gave. Both of them have pointed up advantages of heat exchangers other than the slight thermodynamic advantage to be gained by cooling the liquid. We appreciate these comments and invite the manufacturers to join with us at all times in answering questions which appear in the Question Box. We want our engineers to be the best informed engineers in the world.—H. G. VENEMANN.

We are indebted to D. C. McCoy of Frigidaire for the following comments:

"In looking through the February, 1951 issue of ICE AND REFRIGERATION,

I note your answer to Question No. 873 relative to heat exchangers on "Freon" installations. Thought you might be interested in our viewpoint on this matter.

"While our activities only extend up to refrigeration compressors of the order of 20 to 25 hp from fractional horse power sizes, at least our experience may be worth something to you.

"In the overall, we do not feel that the gains which can be made insofar as increasing refrigeration capacity, are worthwhile calculating when heat exchangers are used. Consequently, we neglect any slight increase in capacity of the system which might come from their use.

"We do, however, recommend the use of heat exchangers or drier coils on practically all of our installations, particularly those which are refrigerated by air circulating over the cooling units. Our recommendation is based on two advantages:

1. The use of a drier coil or heat exchanger assures if the expansion valve is properly adjusted, that all of the coil surface will be actively in use, and that full capacity will develop therefrom.

2. The use of heat exchangers or drier coils is a safeguard against slugs of liquid refrigerant being carried back through the suction lines into the crankcase of the compressor, reducing to a minimum the difficulties which can result from this.

"I believe you have a copy of our Commercial Application Manual in your library, and you will find a discussion of this matter from our viewpoint therein, particularly in the chapters on evaporators and controls and accessories, and probably under condensing units."

ANSWER No. 3: Heat exchangers on industrial applications have been standard with us for many years. The attached catalog sheets illustrate the arrangement which is used on practically every Freon water chiller we build. Some of the reasons for this construction cannot be revealed by studying a Mollier diagram. Cooling of the liquid refrigerant is one of the reasons for the exchanger and sometimes a minor one. Apart from the heat exchange function, the heat exchanger acts as a gas drier. Freon and oil mixtures offer considerable foaming tendency and since the gas is very dense, considerable liquid entrainment is possible.

If the suction gases have as much as 1/10 of 10 percent liquid by volume, the compressor capacity will fall off 7 to 8 percent. The heat exchanger also serves as a collecting header for the suction gases. If only one connection were used, there would be considerable difference in refrigeration level between ends of the vessel and the center. The construction would also be more expensive since the large outlet would have to be a reinforced nozzle construction, while the code does not require this on small connections.

Another reason for the use of heat exchangers which does not show up in a thermodynamic calculation, is the saving in piping which results when the number of pounds of refrigerant per ton is reduced. With more heat carried per pound, the pressure drop in the pipe lines will be considerably reduced.

There are other reasons for the use of heat exchangers. For example, a new candy factory was done entirely with Freon a few years ago. It became necessary in this case to install a liquid cooling heat exchanger, simply to overcome the gas formation which otherwise occurred on the way to the evaporators situated on the upper floors.

In my opinion, heat exchangers on industrial Freon systems can contribute a great deal to the performance of the plant.—E. A. KOTH, Vilter Manufacturing Co.

New Questions

Relief Valve Piping

Question No. 883: In some cases I have seen safety relief valves on receivers and condensers which have no outlet piping. In other words any refrigerant released will blow directly into the air from the valve outlet. The Safety Code directs that discharge from relief devices shall be piped to the outside of the building. Where the relief valve is outside the building, would it not be desirable to attach a discharge pipe to protect people standing near the valve?—J. R. L.

Protection for Relief Valves

Question No. 884: There is another angle to discharge piping from relief valves. Where they are outside the building they would be subject to dirt and corrosion on internal parts if not provided with discharge piping. This is also true if the piping is not properly arranged because rain or condensation could collect in the pipe and run into the valve. Of course rain entry can be prevented by turning the end of the pipe down but what measures can be used to prevent condensation of moisture in the pipe? While we are on the problem, I would also like to know if anyone has developed a set-up that gives an easily noticeable indication when the relief valve leaks.—J. R. L.

Machine Guards

Question No. 885: Last month there were photos of machine guards which were considered good. Is there any standard by which a machine guard can be judged to determine whether it is adequate? Or can you give me some of the basic requirements which a good guard should fulfill?—O. W. C.

NAPRE Department

News Notes and Chapter Activities

New Orleans

By LEO VIVIEN

PRESIDENT Louis Howat and Educational Chairman Frank Chase are working hard to bring about interesting programs for the members. The attendance at the meetings is steadily increasing.

At the March 14 meeting B. Mancuso continued his course on Installation, Operation and Maintenance of Refrigeration Plants. His subject at this meeting was, "Calculations and Materials Needed for Foundations." The lecturer brought out many interesting and practical designs of foundations; including the building of foundations that would not transmit noise throughout a building. Questions from the previous meeting were answered.

The way the older members are taking part in the discussions show the interest created by this type of program. Now that the foundations are laid, B. Mancuso will proceed to the physical parts of the plant.

At the March 28 meeting the usual lecture was dispensed with so that the members could hear W. J. West, Industrial Analyst of the U. S. Department of Commerce, discuss priorities and the use of the DO-97 rating for purchasing supplies and equipment. Since this subject was of general importance, the Chapter used this opportunity to invite engineers and managers from various plants. It was a grand opportunity to show management that the NAPRE strives at all times to further the knowledge of the engineer for the benefit of industry. Unfortunately, we had a terrific rainstorm that night, and whereas many of us braved the elements, the attendance was not im-

pressive as we should have liked it to be.

Mr. West started his talk with a story about how most of us want to do the right thing, but in many instances just don't know the answer. He stressed the importance of knowing Regulation No. 4 issued under date of February 27, assuring us that we will be affected by it. Regulation No. 4 takes care of Maintenance, Repair and Operating Supplies and minor capital additions costing under $750.00. Simply stated it gives every business, Government agency and institution the right to use a rating to procure, maintenance, repair and operating supplies limited to that dollar amount which they purchased in 1950.

Herewith Mr. West gave us the following definitions.

Maintenance: This means the minimum upkeep necessary to continue any plant, facility or equipment in sound working condition when it has been rendered unsafe or unfit by wear and tear, damage, failure of parts and the like. It does not include replacing material in sound working condition with new or different kind. Neither does it include improvements.

Operating Supplies: Means any materials ordinarily carried as operating supplies according to regularly established accounting practices. This would include such items as tools, bits, etc. Materials incorporated in a product may not ordinarily be treated as operating supplies, but they may be so treated where they are normally chargeable as an operating expense according to established accounting practice.

Minor capital additions: means any improvement or addition carried as capital according to your accounting practice where the cost of materials does not exceed $750.00 for any one complete capital addition. No capital addition may be subdivided for the purpose of bringing it under the regulation.

To establish a quota one refers to his book-keeping records. If it has been the practice to consider items as operating supplies, you may continue to do so. Then you obtain a total amount used during the year 1950 and divide by four. That gives you the quarterly quota and that is the amount you can spend during the various quarters of 1951. If your business was seasonal, you may make allowance for seasonal requirements by increasing one quarter and decreasing another. The total however, must not exceed the amount spent in 1950.

Mr. West answered many questions from the floor and assured us of his agency's cooperation for any and special cases. His talk proved very helpful and the members present were grateful for his efforts.

Rio Grande Valley

By Armin Doneis

THE entire session at the first meeting of the month was devoted to questions and answers led by Instructor John Muller. In the beginning the association's question box was utilized and then the discussion proceeded to other related matters.

The reason behind the practice in automatically controlled Freon systems of throttling an exceptionally cold and ample flow of condenser water to prevent head pressures from going too low was discovered in the need for sufficient condenser pressure to push adequate amounts of liquid refrigerant through the preset valves in sufficient quantity. The question was raised whether it might not be advantageous to use a liquid refrigerant pump to circulate the liquid, and let the head pressure go as low as available cooling water could bring it, thereby effecting a considerable power saving. Another question dealing with the effect of fluorine treatment of city water on the cracking tendency of ice was inconclusively considered, and it was decided to wait for replies in the March issue of Ice and Refrigeration as none of the members present had had any direct experience in the matter.

In consideration of the fact that John Muller, our instructor is obliged to attend Reserve meetings on the same nights that our chapter meetings occur, it was moved and voted unanimously to set our meetings on the odd Mondays when Instructor Muller will be at liberty to help us.

This action set the date of the next meeting on April 16 with subsequent meetings to take place every other Monday Evening.

The Board of Directors will meet more frequently to handle the necessary work for the chapter. It was pointed out that the new Refrigeration Course to be distributed to all members from the national office will give a good opportunity to build interest and membership.

The questions in the March issue of Ice and Refrigeration were the subject of discussion led by Instructor John Muller. There were additional ideas on these subjects and questions of direct applications to local conditions were discussed.

Minnesota

By George Gartner

The special speaker at our meeting was Cy Otterholm of the Fin Coil Engineering Co., who gave an interesting and informative discussion of fin coils including their design and application. A number of basic facts he gave resulted in a good discussion later among those in attendance.

Some of the points he made were that new coils will not perform at basic ratings when they are put in service due to film and dirt which accumulate and cannot be removed. The importance of having dry steam in heating coils was emphasized. Mr. Otterholm cautioned that when specifying coils from a selling point, the condition at which the coils are to operate should be accurately specified along with the point at which the temperature is to be measured.

A short movie was shown as furnished by Shell Petroleum Co. It depicted the installation of a pipe line from Texas to Chicago. At the conclusion of the meeting refreshments were served.

Dallas

By F. W. Cunningham

THE regular meeting of Dallas Chapter was held in the auditorium of Alford Refrigerated Warehouses. The special lecture on refrigeration was presented by Elliott Hallowell and was particularly concerned with the preparations for next season's operation. He described how to keep and analyze log sheets and emphasized the value of the information placed on the log. Of course the plant has to have instruments properly installed to obtain the necessary data and Mr. Hallowell drew a diagram to show the location of the various thermometers and gages.

Thermometers, he said, should be installed on water lines to and from the condenser, as well as the condenser liquid drain. Other thermometers should be installed to show the temperature of the suction and discharge gases at the compressor and also the suction gas leaving the evaporator. Pressure gages should show the gas pressure into and out of each compressor. Where the suction lines are long or a number of evaporators are used, it is a good idea to have gages to show the pressure of the gas leaving the evaporators, he said.

Then Mr. Hallowell told how the data from these instruments can be analyzed to determine whether the system is operating close to maximum efficiency. He drew a skeleton Mollier diagram and indicated the system data on this. A special analysis was made of the conditions around the condenser and he showed how to determine whether the condenser needed cleaning, whether sufficient water is being circulated, and whether excess non condensable gas is present. The discussion was concluded with points on monthly and annual comparisons of log sheet data to indicate trends in operation.

The special speaker at the meeting was Emerson Brandt, national secretary who visited the chapter on April 3 and 4. He complimented the chapter on the excellent work it has been doing and the successful promotion of new members. Then he discussed accident prevention methods. Attention was called to the 3 articles on safety and accident prevention in the April issue of Ice and Refrigeration. He pointed out the detailed analysis given to plant hazards and ways of promoting safety and suggested that all the members should participate fully in this activity. Particular causes of accidents and injuries were detailed and Mr. Brandt referred especially to electrical hazards, fires and failures of various portions of refrigerating systems. The discussion of the subject was concluded with a question and answer period in which a number of attendants joined. New members who have joined the chapter recently are: Fred Crawley, Paul Gregory, William Hayes, Vernon Holt, Jack Holton, Harold Koutnik, Bill Smith, Herbert Stafford and George Stewart.

Los Angeles

By Fred Herr

THE annual Engineering Review featured the educational phase of the April 4 meeting of Los Angeles Chapter in the Terminal Club, East Seventh Street and Market Place.

This type of program, which was introduced successfully last year, consists of three sections, in each of which an assigned member reads a technical article selected from a magazine or newspaper. Articles are chosen which the panel member believes to have sufficient merit, from a technical, news or general industry standpoint, to warrant bringing it to the attention of the membership as a whole.

The article is read and then analyzed by the reader, chapter by chapter, with members chiming in with questions and critical comment. In some instances (like Elmer Johnson on April 4) a reader will supplement his verbal review of the article with detailed diagrams and formulae on the blackboard, adding his own comment, pro or con, to that of the original author's.

At the April 4 meeting, the first of three digests was read by William H. Krack of the Sporlan Valve Co., who had chosen as his material for review an article entitled "Know Your Refrigerants." In digesting this material, Krack said that it would appear that the "ideal" refrigerant would require the following characteristics: suitable evaporative and condensor pressures; be relatively low in price and have a high coefficient of performance. In physical properties, he declared, the ideal refrigerant would need be inert, stable, non-toxic, non-corrosive, non-explosive, have low viscosity and be non-contaminating to food.

The second reader was Elmer Johnson of California Consumers Corp. He digested an article by A. W. Ruff entitled "Heat Pump Water Heater," which dealt with a method of heating water by means of a refrigerating unit. Johnson first read straight through the article without comment. He then proceeded to illustrate on the blackboard how this apparent paradox of heating water with a refrigerant unit could be accomplished. Comment and discussion was extremely brisk on this subject, the membership apparently being about evenly divided on whether or not such a project was feasible technically, and if so, would it have any profitable practical application.

Third among the evening's speakers was Alex Shears, refrigeration instructor of the Los Angeles Trade School. He digested an article on "Fundamentals of Hot Gas Defrosting." Shears prefaced his technical discussion with a report about a student in the school's Red Cross Safety class. The ingenious method by which this student announced during examination how he would rescue a person from drowning, had the NAPRE members chuckling for ten minutes, causing much of the technical discussion to be lost.

The preliminary class was conducted by George H. Paulick from 7 to 8 p.m. The subject was problems in installing a direct expansion intercooler on a two-stage compressor.

Chapter President Paulick also presided at the business session, which began immediately after the close of the preliminary class. Roll call revealed the presence of 52 members and guests, among the latter being Tom Davenport of San Francisco, of the Pacific Scientific Company staff.

Cecil D. Bishop, secretary, Transcontinental Pre-Cooling Company, was accepted into membership. This was the 18th new member brought in since January 1, causing Ralph Moore of the membership committee (reporting for Chairman R. D. Burnett)to warn that the chapter was considerably behind its 1950 record in respect to bringing in new members. Moore emphasized that a considerable stepping up of the pace would be required if hopes for a fifth national membership trophy were to be entertained.

Frank Eccleston of the entertainment committee reported that decision had been reached to stage a golf tournament, place and date still to be determined. The contestants will vie for the Quinn Trophy, a cup to be donated by Emmet T. Quinn. Eccleston reported that a tentative date of Sunday June 3 had been suggested for this first gathering of NAPRE Divot Diggers. Those wishing to participate were requested by Eccleston to file their applications early so that an idea may be obtained by the committee on what scale arrangements should be made. The winner will be presented with the Quinn Trophy (suitably engraved) on Old Timers' Night, June 20, in the Terminal Club. The chapter, incidentally, contains some golfers of no mean skill, Rudi Kettler, Herb Royden, among others, and a fine, competitive tourney should result June 3.

Mr. Kettler, co-arranger with Frank Hooper of the deep-sea fishing trips which last year proved quite popular, announced that the first 1951 NAPRE deep-sea fishing expedition would shove off from Port Orange in the predawn hours of July 17. The good ship "Skipalong" has again been chartered for the occasion, with its destination, according to Hooper, ". . . wherever the fish are found—somewhere between California and Okinawa." Whether the fishermen will haul in barracuda, albacore, seabass or yellowtail depends upon what the "Skipalong" encounters first. Signed up for the June 17 expedition are Kettler, Hooper, Royden, Don Clegg, John DeLorie, Dale Rycraft, Ed Boyer, A. Eastman, Lyle Hoffman, E. Marks, Quinn and three of his guests. Hooper announced that reservations for other fishing trips this year are being taken up fast. There are four places open on the July 21 trip, six for August 18, and nine on each of the September and October expeditions.

Mr. Royden reported that W. P. Joplin, one of the pioneer members of Los Angeles chapter, was confined to the Odd Fellows Home at Saratoga, Calif., with an arthritic ailment. Joplin was formerly connected in a refrigerating engineering capacity with California Consumers Corp. and with Birely's.

NAPRE Department

Tulsa

By Melvin Coffey

WE HAD an excellent turnout at our meeting when U. D. Bynum, Carrier Corporation, Dallas presented a program on Air Conditioning. It resulted from good cooperation of everyone in promotional work. President John Wiseman gave a special invitation to owners and superintendents of public buildings. Other members publicized the meeting among the heating and ventilating engineers and the different groups of similar interests. The results were good and we had about 100 in attendance. We welcomed two new members, Herman Pemberton, Engineer, Philtower Building and Paul Renner, operating engineer for Newspaper Printing Corp.

Additional interest was created by the award of 3 Operating Data Books to guests at the meeting. The attendance cards were shuffled and 3 of them were drawn to determine who would receive the Data Books. The lucky men expressed much appreciation for these interesting prizes.

On April 2 Secretary Emerson Brandt visited with us. During the day he met with officers and members of the chapter and visited a number of the local refrigerating plants. In the afternoon he talked to a joint safety meeting of the employees of Tulsa Cold Storage Co., and Beatrice Foods Co.

In accordance with the designation of April as "safety month," Mr. Brandt talked to the chapter meeting about methods used to prevent accidents and injuries in refrigerating plants. He stressed the fact that relatively simple things cause many injuries and gave examples of the methods utilized by different plants in this and other industries to promote safe conditions. In the discussion period which followed a number of the attendants presented specific questions which were analyzed by the speaker and members of the chapter.

Memphis

By Charles Conley

A special dinner meeting was arranged with the Chisca Hotel to welcome Secretary Emerson Brandt who visited Memphis at the time of this meeting. The good group that attended the meeting despite a heavy rain were welcomed by President C. E. Stacks after an excellent dinner had been enjoyed.

The speaker of the evening was introduced by Alvis Clay, national vice president who is also chairman of the local educational committee. Since April is refrigeration safety month, Mr. Brandt took as his subject "Longer Life for the Refrigerating Engineer."

He told the audience that avoidance of accidents and injuries would contribute greatly to a longer and more pleasant life. The causes of accidents in industry were analyzed and he pointed out that the national

safety movement is quite similar to the NAPRE in that information is interchanged among members for mutual benefit. Hazards and mistakes as well as advances in methods are discussed and ways to avoid accidents are developed on a cooperative basis.

Chicago

By E. B. Jones

A PANEL discussion with refrigeration experts representing the different phases and applications featured the first meeting of the month. The leader of the group was Roy Shields, Samuel R. Lewis & Associates who was joined by Alex Weiss, Mid-West Heat Service, Joe Lazar, Refrigeration Systems, Inc., and L. H. Streb, Chicago Conditionaire Co.

When Mr. Shields called for questions there was no hesitation on the part of the audience. In a zero F. room with a blower type refrigerating unit, what is the best defrosting system? This question brought comments from all the panel members, as well as from the floor. The members of the panel expressed agreement that hot gas defrosting with a timing device control would be recommended. Various difficulties such as freezing up the water drain line were discussed. It was suggested that the hot gas line might be run in through the drain pipe or a heating cable could be run through the pipe. In any case there was a caution to make the drain line as short as possible and arrange it for a good pitch toward the outlet.

Mr. Lazar described the defrosting system used on coil which collects moisture taken from blood plasma in a drying operation. This is carried on under a 26 in. vacuum with the coil held at – 75 deg and infra red lamps provide heat to drive the moisture out of the freezing plasma without melting it.

Attention was called to the production of a new hermetic compressor of large size and the effect of this type machine on engineers employment was questioned. It was pointed out that hermetic machines up to about 100 tons capacity in air conditioning have been used for some time. Even though the compressor is hermetic type these modern systems require good, well informed engineers to operate them.

Then the question was asked how can engineers gain knowledge to meet the more complex problems in connection with modern refrigerating systems? The men on the panel said more basic education is needed and it was their belief that the NAPRE in all its cooperative activity is in excellent position to provide basic training. Other questions dealt with separation of oil from Freon vapor, how to decide whether a compressor should be belt drive or direct drive and other operating problems.

A large quantity of engineering material was offered to the meeting attendants and many of them accumulated a good supply for their personal use.

The role of simple things such as improper lifting, slips and falls and inattention as causes of accidents was analyzed. Mr. Brandt pointed out that while machinery can cause serious accidents, more frequently it is the simple things that result in injuries. The meeting was concluded with a question and answer period in which a number of the attendants joined.

At the second meeting Doug Benton, Industrial Engineering and Mfg. Co. discussed the effect of extended surfaces on the rate of heat transfer to coils and pipes.

Colton

By H. O. Bonter

A special meeting was held in which the members met with the refrigerating class at the San Bernardino Valley Junior College. This is a night class and Professor Carleton Richter presented a very interesting lecture to the group. He showed slide illustrations of various types of small compressors. Included were a number of details of construction.

The larger compressors were illustrated in the latter part of the discussion along with charts on the different refrigerants. There was also a display which permitted the attendants to examine small compressors and their parts and study the construction.

Stockton-Modesto

By R. M. Edger

In line with the April safety month idea, we had an experienced specialist address our first meeting of the month. The speaker was R. R. McCarthy who described the methods a number of industries use to reduce accidents which cause material losses and injuries to workers. He gave us many very fine pointers on safety.

Welcomed to membership at the meeting was Kent Baumgardner, chief engineer at the Tracy Ice and Development Co. We initiated our new coffee maker at this meeting and found that it works very well, although a bit slowly. Next time we will start it earlier.

Good Publicity Pays

DO YOU use chapter meeting notices to full advantage? Many refrigeration supply houses and plants have bulletin boards. Arrange to have your meeting notices placed on them. Many more engineers would like to know about them.

Los Angeles Tops P. F. E. Safety Drive

IN THE 1950 safety contest of the Pacific Fruit Express Co., Los Angeles hit the jack-pot. The ice plant, car shops and stores department all won top honors. The ice plant went through the whole year without a reportable or lost-time injury. This added up to 128,776 man hours unmarred by injuries.

Mr. Plummer, left, and Mr. Ferron, right, flank the Los Angeles winners: R. C. Nicols, district storekeeper. Eldon Brown, Sr., safety representative, E. T. Quinn, plant manager, James King, superintendent of car shop.

The company operates 19 ice plants with individual capacities running up to 1000 tons of ice daily. At six locations there are major car shops and store departments. Two other ice plants, at Nampa, Idaho and Gerber, Calif., had perfect records last year. In total these three plants had 292,000 man hours of work without an accident of any kind.

The good records were attributed by John Ferron, Superintendent of Safety, to close supervision and direct attention to accident prevention measures by those in charge of the work. There were two accident free plants in 1949 and three in 1950. General superintendent of refrigeration, Leroy Etzel, predicted the number will increase during the current year.

In a special safety meeting at Los Angeles, the awards were presented to the local winners by K. V. Plummer, general manager of the company.

St. Louis Conference Prepares for Season

THE second annual round-up of refrigerating engineers gave them a pre-season refresher course on operating methods. It was held at the Kings-Way Hotel in St. Louis on March 31. Sponsored and arranged by the St. Louis NAPRE Chapter it drew attendance from the local area and surrounding states.

President Les Fleiter of St. Louis Chapter called the conference to order and welcomed the guests to the meeting. He stated the purpose of the conference, to give engineers a preview of the season's operations and aid them in maintaining reliable plants and keeping costs at a minimum. Then he introduced Don Watkins, general chairman of the conference.

Mr. Watkins said that the conference would feature simple presentations of information that could be applied immediately to plant use. Since accidents can disrupt operations and cost a lot of money, he said a paper had been scheduled by Paul Cassidy, Chief Inspector, Hartford Steam Boiler Inspection and Insurance Co., St. Louis.

Paper on Safety

The paper entitled "Safety Protection for Refrigeration Equipment" was read by A. E. Stevenson of the same company. It traced the development of construction codes for pressure vessels which were initiated by Hartford and later came to broad and well recognized use under the sponsorship of the American Society of Mechanical Engineers. The provisions of the code for utilizing material of known qualities and fabrication by qualified welders under rigid inspection were described.

The code took care of new manufacture but old vessels were a problem because their material and workmanship were unknown quantities. Fortunately it was determined that weld samples of 1¼ in. in diameter could be cut from the vessels and the material and the weld checked on the basis of this sample. Experience has shown that this type of inspection is quite reliable. Where repairs or additional connections are made to pressure vessels competent workmanship is essential because a good vessel can be made defective in this manner.

The paper went on to discuss means for relieving excess pressure and it was stated that relief valves are best. They should have proper discharge lines and should be checked annually to insure positive operation. Rupture discs also are useful in some cases but usually are placed in series with the relief valve.

Accident Sources

Some of the most frequent sources of accidents were listed and preventive measures were described. Corrosion damage causes many failures so it is best to maintain protective measures at all times. Cast iron fittings in brine systems cause many failures and this is also true of inadequate supports for piping. Carelessness and inadequate guards on machinery account for many troubles. The engineers were cautioned that it is a mistake to build up or repair crank shafts with fusion welding. Experience has shown that failure of the shaft results. A good application of metal spray, however, has proved highly satisfactory.

In summary it was recommended that good, reliable equipment be purchased and that operation be entrusted to competent engineers. They should protect the plant against needless deterioration and it should be inspected regularly by a competent agency to insure that the desired results are being obtained. Mr. Stevenson interpolated a number of experiences to develop specific points and give practical examples in connection with the coverage of the subject.

School for Operators

Two sections of the conference program were given in his usual lively and informative style by Professor H. G. Venemann of Purdue University, Chairman of the National Educational Committee. At the morning session he demonstrated "The Ammonia Chart As a Working Tool for Operating Engineers." At the same time he pointed out that this lecture would demonstrate similar usefulness of such charts for any volatile refrigerant. The properties shown on the chart he said, always apply as long as the refrigerant is pure. Where plant conditions do not follow the chart, then the refrigerant is not pure or the thermometers or gauges are inaccurate. He described the chart as much better than refrigerant tables because it gives a complete picture and shows the whole cycle in a system.

Professor Venemann diagramed a system on the chart and then explained the elements of capacity, horsepower per ton, and coefficient of performance. He showed how any deficiency of the system could be determined and gave an analysis of the theoretical work to determine the trend of performance by a refrigerating machine. For economical operation he emphasized keeping the suction pressure as high as practicable and holding the condensing pressure in the lowest range. While the data developed from the chart is theoretical it does permit separation of the various sections of the system into their basic parts. Then Professor Venemann said, for specific data on machine performance the engineer can go to the standard rating tables and he demonstrated their actual use.

Afternoon Session

The conference adjourned for an excellent lunch. After a brief recess an illustrated lecture entitled "Cooperation Solves Problems" was presented by Emerson Brandt, national secretary. The basis of the talk was a number of kodachrome slides on problems with floor heaving in freezers, freezer doors and moisture troubles in freezer insulation. The illustrations and the text outline were furnished by Ed Nelson of The Union Ice Co., Los Angeles and a member of the chapter there. It was drawn extensively from his own experience and the experience of other members to show where these troubles occur, analyzed their causes and described methods used to remedy the conditions, as well as prevent their recurrence. The material will be published in the 1951 Operating Data Book.

At the afternoon session Professor Venemann discussed "Design Factors and Operating Practices Which Affect the Pocketbook." He pointed out that the operator generally has little or nothing to do with the design and construction of a plant, although, of course, it should have good design and well balanced equipment. The engineer, however, should be able to check his plant and judge whether it is adequate. If he discovers deficiencies, he should be in position to recommend changes, estimate the cost of them and predict earnings or savings to be expected from the recommended course.

Design factors of typical plants were then calculated by Professor Venemann. He explained how the basic heat transfer formula is applied to determine the amount of evaporator surface to carry different refrigerating loads. Then he showed how a plant having refrigeration demands at

3 different temperature and pressure levels can be set up to fulfill the capacity requirements with best economy in machines and the power consumption to drive them. Each section of the load was analyzed and it was shown how the total horse-power was at a minimum when the suction pressure in each case was set at the maximum practical level. A number of the attendants participated in the discussion which followed Professor Venemann's lecture.

Question Box

A lively question box session brought out a number of operating problems and questions. They were handled by a panel composed of Eugene Kessler, Falstaff Brewing Co., moderator, with John Dabbs, York Corporation, R. C. Kahdeman, Charles S. Lewis Co., and O. J. Ruel, David Ranken School of Mechanical Trades. There were plenty of questions from the audience and conference attendants also joined in the discussion. Some of the questions were concerned with horizontal versus vertical accumulators; the use of gallon degrees in condenser and brine cooling problems; the effect of Freon in contact with rubber, the protection of plants from lightning damage and modification of centrifugal pumps.

At the conclusion of the question box session, Professor Ruel discussed preventive electrical maintenance. He declared that 90 percent of motor failures have obvious causes and could have been avoided. Greatest source of damage, he said, is dirt or foreign matter, and lubricant in the wrong place bulks large along with simple failure to remove dirt or dust regularly. He gave methods for cleaning motors and also avoiding deterioration due to moisture which is another primary cause of failure. Friction and vibration also cause trouble and he cautioned operators to use the right oil or grease in right amounts, as well as to keep grease seals in good condition. Vibration, he said, loosens parts and causes fatigue which results in breakdown. Alignment should be checked regularly because it frequently is a source of vibration.

Electric controls also require maintenance and adjustment if they are to work satisfactorily. Mr. Ruel listed the principal faults that may develop in controls and told how to remedy them. Among these are tight electrical connections with normal clearances of moving parts and adequate contact pressure. The controls should be kept clean and dry and improper voltage should not be allowed to continue. Thermal relays should be well maintained and shunts should be regularly checked along with the other parts to insure that too large a proportion of the strands are not broken.

Following a very fine dinner the group assembled for color movies and a talk by Vernon Bennett, chief, field division of the Missouri Conservation Commission. Mr. Bennett told about the state organization to develop supplies of wild life and explained the rules and regulations which govern the processing and storage of game. At the conclusion of his talk he answered a number of questions from the audience. The program was concluded with two movies by the Conservation Commission depicting delightful fishing expeditions on streams in Missouri.

Member Contests in Review

DURING the present series of membership contests two of the larger chapters are in the lead. Los Angeles has won five and New Orleans topped four of them. San Francisco Chapter led the way in two and Chicago had a single win.

The section of the contests based upon percentage increase turned up more chapters in the winners column. Stockton-Modesto and Yakima have taken two apiece. Single winners are Detroit, Fort Worth, Fresno, Marion, Minnesota, Sacramento, San Francisco and Seattle. The favors are spread out here and there is no monopoly tendency as demonstrated in the other division.

With the new refrigeration course in prospect many groups declare that they expect to show much more competition to those who have counted on leading the way in the current year. The association in the late summer or early fall will begin distribution of this refrigeration course by direct mail to all members. The prospects who join the association will find it especially desirable to come in early and receive the course beginning with the first section distributed. For this reason the chapters are planning more early work to build their membership for the beginning of this course.

The detail records of former contests show how important it is to secure a good percentage of renewals along with the new members added to the rolls. In three cases chapters with a slightly smaller number of new members won the prizes because they had a better percentage of renewals of current members. The contest rules provide for a bonus, equivalent in percentage to the renewals of current members.

The new refrigeration course adds equal incentive to renewals. In fact many of the long time members are looking forward with anticipation to the time when distribution of the course will begin. Other members will find it equally valuable and desirable. It is a good reason for prompt renewal of membership by all present members.

Previous contests have demonstrated the success of well planned campaigns that begin promptly and carry forward with steady force. They feature the drive for new members but also place emphasis and effort on bringing in a maximum of renewals to increase the bonus close to the limit.

Water Regulations in New York Revised

A REVISION of New York City's water use regulations, relaxing slightly the restrictions on the use of water for air conditioning and refrigeration, was announced March 21 by Dominick F. Paduano, city commissioner of water supply, gas and electricity.

Under the new rules, consumers will be permitted to use air-conditioning and refrigerating units up to six tons without using recirculated water. Since the critical point of New York City's water shortage in December, 1949, the largest units permitted to operate without recirculated water were three tons.

In defining the unit sizes, Paduno said that every horsepower of the motor was equivalent to one ton of air conditioning. Or, in terms of water waste, he said, air-conditioning and refrigerating units are permitted under the rules to use up to two gallons of water a ton a minute. The three-ton units could therefore waste six gallons of water a minute, and six-ton units, theoretically, might waste up to 12 gallons of water a minute.

Paduano announced that studies of water use by his engineers, hundreds of water consumers and by a cooperating committee of the air-conditioning industry had shown that users of five and six-ton air-conditioning units consumed little more water than users of three-ton units. He said that many doctors and dentists, principal users of five-ton air-conditioning units, proved their point to the City Water Department by bringing in their water bills which showed consumption of little more than the three-ton units.

Pallets Solved Problem

(Continued from page 25)

same supervisory force but we are handling an even larger volume. The volume of goods handled per man per day has increased more than 100 percent. When you consider that we paid out our investment in less than three years at the wage scale prevailing in 1948, you can realize what it means to us today. Throw out palletization? Why we simply couldn't operate without it!"

Chicago Section, ASRE

THE Chicago Section American Society of Refrigerating Engineers at its regular monthly meeting held at the Builders Club April 3 heard a talk on Carrier absorption refrigerating machines by O. E. Gamill, manager of compression equipment for Carrier. Mr. Gamill described in detail the savings in refrigeration first cost and operating expenses obtainable with this equipment. He said that with low pressure steam, the absorption unit uses almost 50 per cent less steam per ton of refrigeration than comparable turbine driven compressors. Specific operating cost advantages may be found for the new machine wherever cheap steam or a cheap source of heat for steam is available, Mr. Gammill said.

Among first cost factors, Mr. Gammill cited its lightness in weight and lack of vibration which permit rooftop installation without the need for heavy, expensive foundations. Economic advantages of rooftop location include a major reduction in condenser water piping.

In planning new buildings steam boilers may also be located on the roof, freeing the basement for rental use, and eliminating the entire problem of space consuming smoke and exhaust stacks extending through the building. Mr. Gammill estimated that a five by five foot stack in a 20 story building, with space renting at $5 per square foot, would cost $1,500 per year in lost rental, or $30,000 over a 20 year life period.

Erie Section, ASRE

MEMBERS of the Erie Section, American Society of Refrigerating Engineers, at their regular meeting in the General Electric Community Center, Erie, Pa., heard an address by A. B. Newton, vice-president of engineering, Acme Industries, Inc., on "Large Volume Electric Chilling."

ASRE Spring Meeting Detroit May 27-30

THE 38th spring meeting of the American Society of Refrigerating Engineers will be held in Detroit from Sunday, May 27, through Wednesday, May 30, 1951. Headquarters for the meeting will be the Detroit Statler. Technical sessions and specialized conferences will start Monday morning, May 27; meetings of various ASRE committees will begin on Sunday, the preceding day.

In addition to speakers presenting technical papers at the meeting, George Romney, vice president of Nash-Kelvinator Corp. will address the welcome luncheon on Monday noon, and George F. Taubeneck, of Detroit will speak, following the Tuesday morning technical session, on the critical shortage of materials and the effect on the refrigeration industry. Mr. Romney is well known in the motor capital for his civic as well as industrial activities; Mr. Taubeneck is noted as a forceful speaker in the refrigeration industry.

Technical Sessions

Formal technical sessions will be held on Monday, Tuesday, and Wednesday mornings when authorities in their respective fields will present papers on a variety of subjects. Topics to be covered are:

Comfort Air Conditioning: Papers on design and control of small air conditioning systems will be presented. D. D. Wile of Refrigeration Engineering, Inc., will speak on design and W. T. Smith of U. S. Air Force will present a paper on humidity control.

Industrial Refrigeration Applications: Refrigeration equipment design for use below minus 20 F will be described by E. R. Michel of Worthington Pump & Machinery Corp. A paper on refrigeration in greenhouses by A. J. Hess of Hess-Greiner & Polland will continue the report of his studies for this application originally presented at the 1949 Annual Meeting of ASRE. C. W. DuBois of Minute Maid Corp. will discuss the effect of storage temperatures on the stability of citrus concentrates.

Design: Leon Buehler Jr. of Creamery Package Manufacturing Company will report new data on design and service life of multicylinder ammonia compressors.

Refrigerants: A paper on solubility of air in Freon will be given by H. M. Parmalee of Kinetic Chemicals, Inc.

Insulation: A paper on the physical characteristics of shredded redwood bark fiber insulation by Edward Simons, consulting engineer of San Francisco and ASRE vice president, will be presented.

In addition to these technical papers, the domestic refrigerator engineering conference, a popular feature of recent ASRE meetings, this year will stress application of electric motors to hermetic compressors. H. H. Bixler of General Electric will present the lead-off paper; Milton Kalischer of Westinghouse is chairman of the Conference.

Leon Buehler Jr. of Creamery Package is chairman of the Program Committee. Other arrangements for the meeting are in the hands of the ASRE Detroit Section under the direction of chairman Edward Kellie, president of Aminco Refrigeration Products Company. His convention committee is made up of the following: G. H. Poggen, vice chairman; H. J. Scullen, inspection trips; F. J. Drogosch, transportation; G. R. Kingston, golf; E. Feinberg, entertainment; C. D. Mericle, publicity; F. Y. Carter, reception; G. H. Poggen, finance; G. B. Bright, old timers; and Mrs. T. P. Ammel, ladies committee.

Entertainment

Among the entertainment features being planned by the Detroit Section, host to the event, are the President's Reception Sunday evening, Monday's welcome luncheon and the Monday night surprise party. Tuesday night the traditional cocktail party and dinner-dance will be held.

Inspection trips to Nash-Kelvinator, Ford Motor Company, and J. L. Hudson department store; the Annual ASRE Golf Tournament; and committee meetings will fill out three busy days for the refrigerating engineers.

New Orleans Section ASRE

THE service provided by the American Society of Refrigerating Engineers to its members, the public and industry, was outlined at a meeting of the New Orleans Section, Monday evening, March 5, by M. C. Turpin, National Secretary.

Mr. Turpin said the A.S.R.E. sets standards for manufacturers on all types of refrigerating equipment and that most reputable manufacturers follow this established standard.

Preliminary plans were discussed briefly for the Society's annual convention to be held at New Orleans, December 2-5.

Refrigerator and Freezer Manufacturers Form Group to Conserve Materials

MEMBERS of two special task groups to work on problems of the refrigeration industry in the mobilization program were named at a meeting of NPA officials and an industry advisory committee in Washington late in March. The two committees represent makers of household refrigerators, and makers of farm and home freezers. The membership is as follows:

Refrigerator Task Group

G. H. Meilinger, Manager of the refrigerator division of Westinghouse Electric Corp., Mansfield, Ohio, chairman of the group.

H. L. Clary, Vice-president in charge of sales of the Norge Division of Borg-Warner Corp., Chicago, Ill.

F. J. Bommer, Vice-president of the Sanitary Refrigerator Company, Fond du Lac, Wis.

H. M. Kelley, Appliance sales manager for Frigidaire Division of General Motors Corp., Dayton, Ohio.

D. A. Packard, Manager of household sales for the Nash-Kelvinator Corp., Detroit, Mich.

Freezer Task Group

L. J. Sorensen, Vice-president and general manager of the Deep Freeze Appliance Division of the Motor Products Corp., North Chicago, Ill.

J. H. Overmyer, Vice-president of sales, Revco, Inc., Deerfield, Mich.

J. K. Noel, Jr., Vice-president of Victor Products Corp., Hagerstown, Md.

John W. Krueger, Vice-president of Seeger Refrigerator Co., Evansville, Ind.

M. V. Keeler, General Manager, refrigerator division of International Harvester, Chicago, Ill.

The two task groups are made up of members of the overall Mechanical Household Refrigerator-Farm and Home Freezer Manufacturers Industry Advisory Committee of the NPA. NPA officials informed the committee of the effects of the agency's conservation orders on steel, aluminum and copper. Industry members were told that supplies of steel and copper probably will be restricted further as needs of the defense program increase, and that future limitations on aluminum will depend on military requirements.

Industry men said zinc and nickel supplies present problems in the industry and that refrigerator and freezer manufacturers are using plastics increasingly. Cobalt, used in porcelain enamel, was reported in extremely short supply. Conservation in the use of this enamel in the industry was recommended.

Industry members reported adequate inventories on refrigerators, but not on freezers. They said there is a demand for more freezers than manufacturers are now permitted to make.

The need for conservation of all strategic materials was stressed, and NPA men listed these five main points on conservation: (1) simplification, to eliminate non-essential items on products; (2) standardization, which industries are free to engage in under government sponsorship; (3) use of alternate materials to conserve those in critical supply; (4) suggestions for modification of government specifications to save scarce materials, and (5) salvage, on which it was urged that salvage committees be appointed in all plants to save scrap.

Concerning the ratio of standard and deluxe models that may be manufactured, the committee told NPA men that the copper and aluminum orders will make any increase in the production of deluxe models unlikely, and that their percentages of leader, standard and deluxe models will remain about the same as at present.

Program on Repair Parts

Officials expressed the hope the NPA would soon develop a program on repair parts for the industry. The group discussed the advisability of a repair parts program for all household appliances, rather than merely for individual products like refrigerators and freezers. Committee members suggested that service managers in the industry be consulted on this problem.

Committee members raised objections to the provisions in NPA order M-47 which limits the use of steel in the production of individual items of manufacture. They said they would prefer to have limitations merely on total usage of steel and other materials, which would permit greater flexibility in the industry and allow production of items to be attuned to consumer demands.

Items proposed for inclusion in the agenda for the next meeting of the committee were zinc, nickel, plastics, and the essentiality of manpower for repair parts. The next meeting of the full Advisory Committee was tentatively set for Tuesday, Nov. 1.

Book Review

THERMODYNAMICS (Second Edition) By George A. Hawkins, Professor of Thermodynamics, Purdue University. Published by John Wiley & Sons Inc., New York. Illustrated. 564 pages. Price $6.50. For sale by Nickerson & Collins Co., Chicago 44, Ill.

The first edition of this book was written in 1946 to provide a well-balanced treatment of the subject of engineering thermodynamics. This primary aim was carried into the writing of the second edition, but with major revisions resulting from suggestions and constructive comments received from many of the author's associates in academic and industrial circles. Much new material was added and many chapters were completely rewritten. Valuable features of the first edition are retained, including a balance between theory and practical application, emphasis on correct use of units in the solution of problems, and showing the reader through discussions and examples the use of the subject in areas of engineering and science other than his own. Ideal systems are studied to show the reader how nearly they predict the behavior of the actual.

ASRE Pamphlet Describes Theater Air Conditioning

AIR conditioning a theater is very different from air conditioning a store or office, and ASRE's latest Application Data Section tells the why's and wherefore's of theater air conditioning. The fundamental requirements of air conditioning systems for theaters can be met only by the most careful selection and coordination of all parts of the installation, the pamphlet points out.

It contains detailed information on inside design conditions, cooling load, outside air quantity, air circulation, required air, equipment size, location and arrangement of apparatus, selecting the type of refrigeration system, exhaust air systems, and automatic control.

"Air Conditioning in Theaters" was written by G. B. Priester and O. W. Armspach. Mr. Priester is an air conditioning engineer with Consolidated Gas, Electric Light & Power Company of Baltimore and co-author of the book "Refrigeration and Air Conditioning". Mr. Armspach is New York district chief engineer of Carrier Corp.

Copies of AD 16-R may be obtained from the American Society of Refrigerating Engineers, 40 West 40 Street, New York City.

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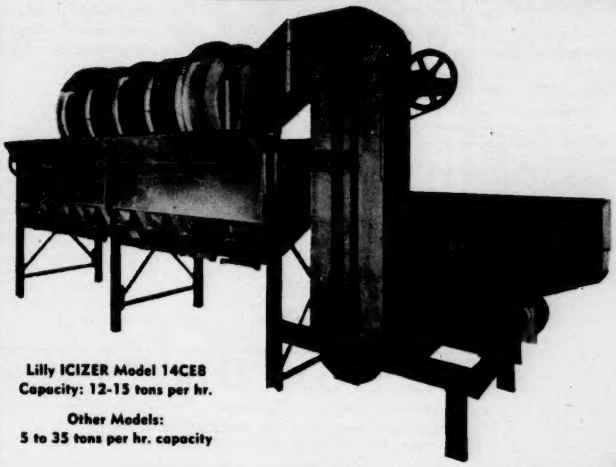

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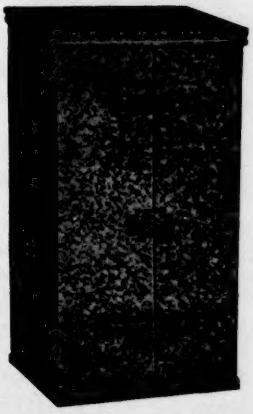

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Commercial Refrigeration Equipment and Supplies

THERE were 1,223 houses (establishments) in the United States primarily engaged in selling commercial refrigeration equipment and supplies in 1948. Dollar volume of business for these houses totaled $220 million during the year, according to a report released by the Bureau of the Census, U. S. Department of Commerce.

The trade employed 8,067 persons during the week of November 15, 1948, with a pay roll for the week amounting to more than one half million dollars. In addition, 824 proprietor - owners of unincorporated houses devoted the major portion of their time to the business during November.

Total operating expenses (including pay roll), sometimes known as "overhead," amounted to slightly more than $50 million for the year, or 24 percent of sales. Pay roll totaled $28.6 million or 13 percent of sales. Neither pay roll nor operating expenses include any allowance or compensation of proprietors of unincorporated businesses.

California led all other states with sales totaling $25 million and New York was second with $23.9 million. Together the two states accounted for more than 22 percent of the national total.

The table included in this release presents data collected in the 1948 Census of Business, a nationwide survey of all wholesale establishments, retail stores, and selected service businesses in the country. This is the first business census in which commercial refrigeration equipment and supply houses were classified separately.

This release is one of a series on wholesale trade showing basic data on establishments, sales, expenses, pay roll, personnel, and stocks for states, geographic divisions, and the United States. Data for cities, metropolitan areas, and states for wholesale, retail, and selected service trades, are being issued in a series of 1948 Census of Business Area Bulletins which may be ordered from the Superintendent of Documents, Government Printing Office, Washington, D. C., by requesting "Announcement of 1948 Census of Business Area Bulletins," the official order blank. Additional reports now in the preparatory stage cover such subjects as size of establishment, analyses of expenses, merchandise line sales, credit sales, receivables, and legal form of organization. Inquiries relative to these subjects should be addressed to the Bureau of the Census, Washington 25, D.C.

This trade includes supply houses primarily engaged in selling commercial refrigeration equipment such as refrigerators, display cases, freezers, dispensers, water coolers, and food locker equipment to stores, restaurants, hotels, offices and other commercial users. Distributors specializing in the sale of refrigeration components and accessories are also included. Many houses combine sales and service. Not included in this report are sales branches and offices of manufacturers of commercial refrigeration equipment and supplies.

New Incorporation

Saranac Lake, N. Y.—Articles of incorporation were filed with the office of the secretary of state, Albany, for Lincoln Mountain Vaults, Inc., cold and refrigeration storage business. Capital stock was listed at 100 shares no par value. Directors: Jasper J. O'Neill, North Cliff Drive, Center Island, N. Y. Francis X. Coughlan, 80-15 234th St., Bellerose, N. Y., and Margaret H. O'Neill, North Cliff Drive, Center Island, N. Y.

Convention Calendar

A.S.R.E. SPRING MEETING

May 27-30, 1951
Hotel Statler, Detroit, Mich.
M. C. TURPIN, Secretary

Association Directory

AMERICAN INSTITUTE OF REFRIGERATION
H. T. McDermott, Gen. Secretary, 433 N. Waller, Chicago 44, Ill.

NATIONAL ASSOCIATION OF ICE INDUSTRIES
Mount Taylor, Secy., 1706 L St., N. W., Washington 6, D. C.

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
Wm. Dalton, Exec. Vice-Pres. Tower Bldg., Washington 5, D. C.

NATIONAL ASSOCIATION OF PRACTICAL REFRIGERATING ENGINEERS
Emerson A. Brandt, Secretary 435 N. Waller Ave., Chicago 44, Ill.

CALIFORNIA ASSOCIATION OF ICE INDUSTRIES
Jack L. Dawson, Secretary
461 Market St., San Francisco, Calif.

CANADIAN ASSOCIATION OF ICE INDUSTRIES
Mrs. Mildred E. Croft, Secretary
317 Eglinton Ave., Toronto, Canada

DELTA STATES ICE ASSOCIATION
R. N. Milling, Secretary
Ouachita Bank Bldg., Monroe, La.

EASTERN STATES ICE ASSOCIATION
Samuel Freer, Secy.-Treas.
12 So. 12th St., Philadelphia, Pa.

FLORIDA ICE ASSOCIATION
Muriel Washburn, Secretary
1926 Silver St., Jacksonville, Fla.

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
W. D. Wright, Secretary
Clinton Pure Ice Co., Clinton, Ill.

INDIANA ASSOCIATION OF ICE INDUSTRIES
Robert W. Walton, Secretary
Board of Trade Bldg., Indianapolis, Ind

KANSAS ASSOCIATION OF ICE INDUSTRIES
C. A. Berkhiser, Secretary
Manhattan Ice & Cold Storage Co.,
Manhattan, Kans.

KENTUCKY ICE MANUFACTURERS ASSOCIATION
R. T. King, Secretary
429 S. Seventh St., Louisville, Ky.

MICHIGAN ICE INDUSTRIES ASSOCIATION
Edward W. Jackson, Secretary
131 E. Kalamazoo Ave., Kalamazoo, Mich.

MISSOURI VALLEY ICE MANUFACTURERS' ASSN.
V. A. Esphorst, Secretary
3820 Washington St., St. Louis, Mo.

MOUNTAIN STATES ASS'N OF ICE INDUSTRIES
J. R. Espy, Secretary
Espy Ice Co., 2229 - 15th St., Denver, Colo.

NEBRASKA ASSOCIATION OF ICE INDUSTRIES
Frank Vogelsang, Secretary
W. T. Good Ice Co., Lincoln, Nebr.

NEW ENGLAND ICE ASSOCIATION
Raymond Wilber, Secretary
83 Winter St., Providence, R. I.

NEW YORK STATE ASS'N REF. WAREHOUSES
Chas. G. Ashe, Secretary
101 Columbia St., Buffalo 5, N. Y.

NORTH CAROLINA ICE ASSOCIATION
Lewis H. Powell, Secretary
Capital Ice & Coal Co., Raleigh, N. C.

NORTHWEST ASSOCIATION OF ICE INDUSTRIES
L. F. Marsh, Secretary,
1539 N. E. 37th Ave., Portland, Ore.

OHIO ASSOCIATION OF ICE INDUSTRIES
Elizabeth Shannon, Acting Secy.-Treas.
The Steubenville Ice Co., Steubenville, O.

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
Harry T. Hudson, Executive Secretary
708-9 Perrine Building, Oklahoma City, Okla.

PACIFIC STATES COLD STORAGE WAREHOUSEMEN'S ASSOCIATION
Jack L. Dawson, Secretary
461 Market St., San Francisco, Calif.

SOUTH CAROLINA ICE MANUFACTURERS ASS'N
Geo. L. English, Secretary
P. O. Box 603, Columbia, S. C.

SOUTHERN ICE EXCHANGE
Richard W. Florrid, Secretary
11½ Forsyth St. N. W., Atlanta, Ga.

SOUTHWESTERN ICE MANUFACTURERS ASS'N
P. A. Weatherred, Secy. Counsel,
Mercantile Bank Bldg., Dallas, Tex.

TENNESSEE ICE MANUFACTURERS ASSOCIATION
W. E. Harlan, Secretary
Mt. Pleasant Ice Co., Mt. Pleasant, Tenn.

TRI-STATE ASSOCIATION OF ICE INDUSTRIES
L. R. Girton, Secretary
260 Boyce-Greeley Bldg., Sioux Falls, S.D.

VIRGINIA ICE MANUFACTURERS ASSOCIATION
H. H. Snyder, Secretary
Alexandria, Va.

WEST VIRGINIA ASSOCIATION OF ICE INDUSTRIES
E. Dana Smith, Secretary
Diamond Ice & Coal Co., Charleston,
W. Va.

WISCONSIN ASSOCIATION OF ICE INDUSTRIES
Paul F. Hoff, Secretary
1300 East Locust St., Milwaukee, Wis.

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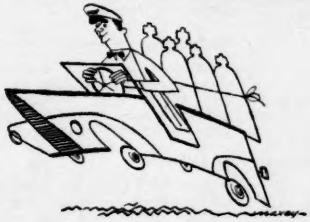

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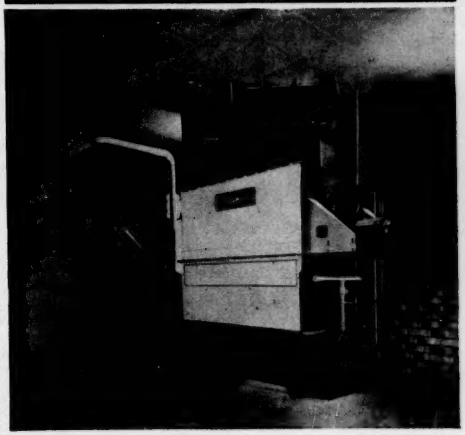

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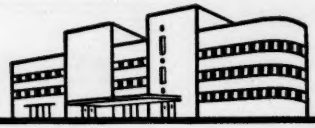
NEW PLANTS and  IMPROVEMENTS

This Department each month presents the more important developments covering new constructions, as well as additions, improvements, remodeling, and installations of new equipment in ice and cold storage plants and other industrial plants that use refrigeration. News notes on all such new constructions and improvements are invited.

Alabama

Dadeville, Ala.—The Tallapoosa Ice Co. has installed two specially designed Sturdy-Built ice vending machines.

Arkansas

Searcy, Ark.—The Birdseye Division of General Foods Corp. will establish a quick-freeze plant here to process strawberries, it was announced recently by Arthur E. Pittard of Rochester, N. Y.

California

Alameda, Calif.—The Army has annouced that it will construct a $1,600,000 cold storage plant at the Alameda Intransit Depot.

Dinuba, Calif.—Dave Zigman, who has been in the poultry business in this district for the past 16 years, took out a permit recently to rebuild his turkey processing plant at 390 West Tulare St., at an estimated cost of $30,000. The plant was virtually destroyed by fire last summer.

Orange Cove, Calif.—A large addition to the present cold storage plant, approximating an investment of $65,000 and some $35,000 in added refrigeration machinery is under way at the B.H. & O. Cold Storage plant of Fred and Herman Bear, Harvey Hansen, and Floyd Olson. The present structure which holds about 150,000 lugs of grapes or other fruit, was built about three years ago. The addition will increase the storage space some 60,000 lugs.

Lodi, Calif.—A building permit has been issued to the Tokay Cold Storage Co. for construction of an $80,000 cold storage plant at 521 S. Main St. The new plant will be built on the site of the American Fruit Company where a large packing and shipping shed was destroyed by fire in February. Burton A. Towne, Jr., company district manager, said the plant will be independent of the fruit company.

Sacramento, Calif.—The Regal Petroleum Corp., owners and operators of many 24-hour self-serve gasoline properties have installed S & S ice vending stations here and also in Stockton, Calif.

Canada

Toronto, Ont., Canada—The Lake Simcoe Ice & Fuel Ltd., has received delivery on the first two of ten Sturdy-Built ice vending machines. These vendors will be installed in refrigerated stations which were built locally. A special coin mechanism to accept Canadian nickels was designed.

Colorado

Rocky Ford, Colo.—Polar Ice & Locker Company is now operating a new S & S vending machine.

Denver, Colo.—Earl Maddox announces installation by the Maddox Ice Co., here of two additional Sturdy-Built vending stations. These stations were built to order.

Georgia

Columbus, Ga.—A modern new distribution plant for Borden's Ice Cream Co., is under construction in Phenix City. The new plant, which will serve a radius of about 50 miles, is expected to be ready for occupancy this month. It is located at 901 Thirteenth Street.

Indiana

Princeton, Ind.—The Henneberger Ice Company recently installed their second Sturdy-Built ice vending station. The new station is located in the heart of the Princeton shopping area.

South Bend, Ind.—The City Ice Service, Inc. (one of the "Big Ten" group) has added another Sturdy-Built vending station.

Michigan

Benton Harbor, Mich. — Millburg Growers Exchange, frozen fruit packer, has expanded its freezing and zero holding capacity. Three million pounds can now be stored, and 60 tons of products frozen every 24 hours at minus 25 degrees tunnel temperature. The Exchange reports that it is using a new 32 foot aluminum trailer equipped with four-inch insulation and Thermo King refrigeration to transport its frozen fruits.

Suttons Bay, Mich.—The Frigid Foods Products Inc., is completing a cold storage addition to its plant here before the new cherry pack begins. The construction is brick over frame, and there will be 12 inches of insulation in floors and roof and eight inches in the walls of the 206x83 foot addition. Ralph Bauer Associates of Traverse City are the architects.

Missouri

Monroe City, Mo.—The Monroe City Ice Company has three Sturdy Built ice vending stations in operation, one here, one at Palmyra and most recently one opened at the junction of U. S. Highways 61 and 36 at Hannibal. This latter station contains three machines that vend 25 lb blocks, half bushels and one peck bags of sized ice.

Sedalia, Mo.—The Sedalia Ice Co. of Sedalia, Mo., has put into operation a new Sturdy-Built refrigerated ice vending station to dispense block, crushed and cube ice.

St. Louis, Mo.—Ball Ice Machine Company has installed eleven new S & S ice vending machines. The new units are for the sale of processed packaged ice exclusively.

New Jersey

Linden, N. J.—Two more Sturdy-Built 20 foot ice vending stations each equipped with three vendors have been put into operation by Chas. H. Koenig of this city.

Trenton, N. J.—The Sanitary Ice Company have installed a Sturdy-Built ice vending station from which they will dispense packaged, prepared ice.

Oklahoma

Miami, Okla.—The Western, Inc., meat packing plant, idle since early last August after a siege of labor strife, has been cleaned and renovated preparatory to re-opening.

Oregon

Portland, Ore.—An $80,000 fruit and produce warehouse to serve Fred Meyer stores and the company's Alaskan trade is to be built at SE 3rd Avenue and Alder Street. Cold storage will be provided to care for six carloads.

Pennsylvania

St. Clair, Pa.—W. Y. Hay reports new installation of a Sturdy-Built ice vending station to be located here.

Utah

Ogden, Utah—Moore Ice Delivery Company of this city has established another S & S ice vending station. The new station will sell 25 lb blocks, 10 lb bags of cubes and 25 lb bags of crushed ice.

West Virginia

Wheeling, W. Va.—The L. Niebergall Ice Company has reecntly installed a Sturdy Built ice vending machine for the dispensing of 10 lb packages of ice cubes.

Wyoming

Laramie, Wyo.—Work is under way on a $1,000,000 manufactured ice plant for the Pacific Fruit Express Company. The plant will replace the company's natural ice facilities.

your way to greater profits through CLEARER Ice

LOWER FIRST COSTS
LOWER MAINTENANCE COSTS
REDUCED SHUT-DOWN TIME
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Sales and Reorganizations

Du Quoin, Ill.—The Du Quoin Ice Company was purchased recently from Steve Riggio by William Strickland of Pinckneyville. Mr. Strickland has taken over operation of the newly constructed ice storage house built by Mr. Riggio after the Illinois Power Company closed its plant last summer. The new owner said he expects to continue to provide home delivery service.

Gary, Ind.—Barnes Ice and Coal Co. Inc., has purchased the Pennsylvania ice plant at 21st and Jefferson and will convert it to cold storage use, David L. Barnes, president of the corporation, announced recently. The operation will include facilities for quick freezing of volume quantities as well as storage. The ice tonnage production has been shifted to the Barnes plant.

Lancaster, Pa.—The 99-year old Sprenger Brewery was sold at public auction recently. The brewery was founded in 1852 by the late John Abraham Sprenger. The plant made near-beer in prohibition days, later soft drinks and was operated for a time as an ice plant.

El Campo, Tex.—The ice plant and frozen food locker facilities of the Central Power & Light Company here were purchased recently by the newly-organized El Campo Ice & Locker Company. R. P. Lampley is president of the new company.

Bellingham, Wash.—Remaining assets of Polar Frosted Foods Co., including the Seattle plant, packaging supplies and trade names, have passed to Cedargreen Frozen Pack Corp., N. W. Cedergreen, president of the latter, announced recently. Cedargreen acquired Polar's plants at Mount Vernon and Grandview under an earlier transaction.

Fires and Accidents

Sunbury, Pa.—The ice plant and warehouse of the Sunbury Milk Products Co., 170 Lenker Ave. was destroyed by fire, the loss estimated at between $125,000 and $150,000 according to W. J. Engle, head of the firm. Cause was believed to have been a short-circuited motor.

Salt Lake City, Utah—An explosion knocked out the south wall of a cold storage plant at 440 South First West St. The blast rocked a quarter-block area, and was followed by a fire. An investigation disclosed that a pile of inflammable material had been placed on a wooden fence near the southwest corner of the building where the fire originated. The fire spread through the wall into a fiber insulation and smoldered for some time in the material, creating a gas which eventually exploded.

Icy Item

New Orleans, La.—New Ice Company, Inc., has been granted dissolution of its charter of incorporation, the office of the secretary of state at Baton Rouge, La., announced recently.

DEATHS

Leo A. Fretz

THE death of Leo H. Fretz, organizer and a partner of the Pontiac Ice & Fuel Co., Pontiac, Ill., occurred April 11 at St. James Hospital, Pontiac. Mr. Fretz, who was 63 years old, had been a patient in the hospital for three weeks and had been ill three months.

Mr. Fretz was born in Alsace-Lorraine and came with his parents to the United States when six years old. He lived in Grand Forks, N. D., as a child and attended boarding school in Winnipeg, Canada. He is a graduate of Marquette University, Milwaukee, and the University of Wisconsin.

With the late Dan Donovan, Mr. Fretz helped to establish the Pontiac Ice & Fuel Co. in 1920. Mr. Donovan died in 1948 and his duties and interests were taken over by his son Kenneth. Under the able management of the founders, the business was rapidly expanded into a modern ice manufacturing plant with locker plant, dairy products, and ice-using appliances. Branches are located in a number of adjacent cities.

Mr. Fretz was an active member of the Illinois Association of Ice Industries and was respected and liked by all who knew him. He was president of the East Side Country Club, past president of the Pontiac Chamber of Commerce and of the Pontiac Credit Bureau. He was a member of the National Frozen Food Locker Association and a member of the Pontiac Elks and Moose Lodges.

William Hatfield Darragh

A PIONEER of Memphis, Tenn., Capt. William Hatfield Darragh, 90, retired coal and ice firm executive and onetime Mississippi River steamboat captain, died April 7. Capt. Darragh founded the old Consumer's Coal and Ice Co. in 1894 and managed it until he retired. His interests were sold to the Bluff City Delivery Co. He was one of the city's colorful figures. Memphis oldtimers recall his beautifully groomed span of eight draft horses hitched to a yellow and black ice wagon in many parades near the turn of the century.

William J. Burke

THE death of William J. Burke, Birmingham, Ala., branch manager of the Southwestern Ice Company for 18 years, occurred March 1 at a Birmingham hospital. He was 50 years old and had lived in Birmingham all his life. He was a member of the Blessed Sacrament Catholic Church.

Clement B. Wissing

THE death of Clement B. Wissing, 63 years old, for many years secretary and sales manager of the Ebner Ice & Cold Storage Co., Vincennes, Ind., occurred at his home April 16 of a heart attack. Last September he resigned from the Ebner Company to form his own sales agency for a water softener and later became branch manager for the S & S Vending Machine Co.

Mr. Wissing was an active member of the National Association and the Indiana Association of Ice Industries and had served on important committees of both associations. During and following World War I, he was associated with the Nordyke Marmon Co., Indianapolis. In 1934 he returned to Vincennes as secretary and sales manager of Ebner Ice & Cold Storage Co.

J. T. Freeland

AFTER a long illness, J. T. Freeland, president of the Pacific Ice & Storage Co., Dallas, Tex., died April 2 in a Dallas hospital. He was 78 years old.

Mr. Freeland was born in Tennessee and came to Texas with his parents when a small child. He moved to Dallas in 1898 and entered the ice business. In 1922 he organized the Pacific Ice & Cold Storage Company and was president of the company at the time of his death. He had been engaged exclusively in the ice business most of his life. He was a member of the Odd Fellows Lodge.

Joseph Le Grand

THE death of Joseph Le Grand, president of the Le Grand Ice Co., Holyoke, Mass., and a leading ice producer in that section, occurred Feb. 26 in St. Petersburg, Fla. He was 88 years old. Mr. Le Grand, with his six sons, operated a large natural ice business for many years, and in 1928 built an ice manufacturing plant in South Hadley. He retired from active business several years ago.

John W. Schilling

THE death of John William Schilling, owner and operator of the Schilling Ice Distributing Company, Erie, Pa., occurred from a heart attack while visiting at the East Erie Turners Club, March 20. He was 60 years old. A native of Erie, Mr. Schilling had lived there all his life and was well known throughout the city.

ALLEN M. MCCURDY, 66, retired coal and ice dealer, Erie, Pa., died March 31, in St. Vincent's Hospital following a short illness. He operated the Standard Coal Co. until his retirement in 1943.

Use DISTILEX

This Way To Produce QUALITY ICE

Dispense with SODA ASH, SODIUM ALUMINATE, ALUM and Similar Products . . . and SIMPLY MIX DISTILEX WITH THE LIME YOU ARE NOW USING

Block on left treated with Distilex, only one core emptied. Right, untreated water, cores were emptied twice. Most Distilex users do not empty cores at all.

RESULT...

High Grade Crystal Ice from raw water . . . ICE free from slime and deposits . . . ICE without color, odor, taste . . . ICE which can be produced at very low temperature* with no cracking while being frozen, dumped or cut.

*** DISTILEX** treated water can make Ice in LESS THAN 35 HOURS at 10° brine temperature!

Test DISTILEX in Your Plant. If Not Entirely Satisfied, Purchase Price Will Be Refunded On ALL DISTILEX Returned.

$25.00 per 100 lbs.
f.o.b., Birmingham

Use SOLVEX for COMPRESSOR COOLING SYSTEMS

To LOWER HIGH HEAD PRESSURES, To REMOVE RUST, SCALE, ALGAE, OIL AND ENCRUSTING MATTER

from condenser tubes and water jackets in one to five days operation.

USE The CSCO STABLEIZER To Maintain Good BRINE!

A scientific combination of pure metals upon which damaging materials "feed" in preference to the brine tank or ice cans, thereby SAVING THEM! Removes destructive materials from the brine without adding harmful chemicals.

Write NOW for Further Particulars on These MONEY-SAVING AIDS TO BETTER ICE MAKING!

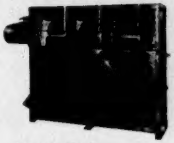
CHEMICAL SOLVENT COMPANY
Birmingham, Ala.

You can be sure of the exact performance you require when you specify ACME. With more than 30 years of close cooperation with the Refrigeration Industry, ACME Engineers are in a position to produce the exact requirements you want and save you money in addition. When you specify ACME you get the best in Refrigeration equipment.

Ammonia condensers

1. Exclusive lock-nut construction available for quick and easy tube replacement.
2. A.S.M.E. construction and certification.
3. "Tailor-made" to specifications.
4. Dependable, versatile and economical.
5. Full range of models, types and sizes.

Blow-cold* industrial unit coolers



1. Hot-dip galvanized AFTER fabrication.
2. Vertical or horizontal discharge.
3. Easy accessibility to coils.
4. Separable fan section.
5. Large inspection doors.
6. Air duct front or back.
7. Use with Freon 12 or Ammonia.

* Trade Mark

Evaporative condensers

1. For Freon or Ammonia.
2. Capacities from 120,000 to 1,250,000 Btu/hr.
3. Flexible fan section.
4. Hot-dip galvanized AFTER fabrication.
5. Available with internally mounted receivers, including piping.
6. Micromet basket for water treatment.

You can depend on ACME'S fine workmanship. ACME'S long experience and practical knowledge are yours for the asking. Let ACME Engineers help you solve your unusual heat transfer problems. ***Write for information or for catalog on equipment in which you are interested.***

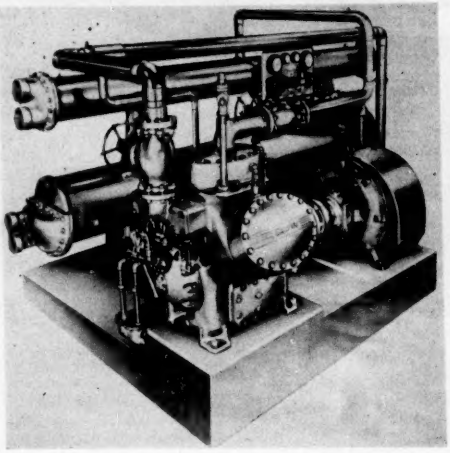
ACME INDUSTRIES, INC.
Dept. IR
Jackson, Michigan

What's New

MACHINERY
APPLIANCES • PROCESSES

New Reciprocating Machines For Air Conditioning

TWO models of reciprocating refrigeration machines specifically designed for air conditioning and refrigeration use in the 100 to 150 hp range are announced by Carrier Corporation. The reciprocating machine —designated as the Carrier 30B—is furnished as a complete package with compressor, cooler, and condenser, and all inter-connecting piping, fittings, safety and capacity controls, gauge board, and cooler and condenser stands included.



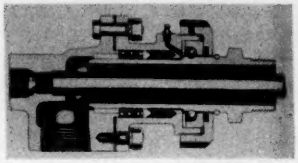
New Carrier Reciprocating Refrigeration Machine

The reciprocating compressors used in 30 B models are part of Carrier's standard list of reciprocating units. This list includes compressors ranging in size from 3 to 200 hp. Four and six cylinder compressors of the type built into the new machines may be obtained as separate units for use with either Freon, ammonia or Carrene 7 refrigerants in 75 hp. to 200 hp.

Other Carrier reciprocating compressors now available include 2, 3, 4, 6, and 8 cylinder models for use with Freon over a range of 3 to 60 hp. The 4, 6, and 8 cylinder models may be obtained in various duplex combinations in 60 to 125 hp. sizes.

New Revolving Joint

INTRODUCTION of a new, compact, improved type of revolving joint for use in making piping connections to drum type dryers, rolls, calendars, and other rotating equipment is announced by Barco Manufacturing Co., Chicago, Ill. Designated as Type

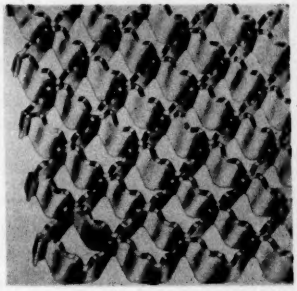


New Barco Revolving Joint

IBR, the new joint is characterized by extremely low torque, thus offering substantial power savings. Models are available for handling steam, oil, air, water, gas, and chemicals.

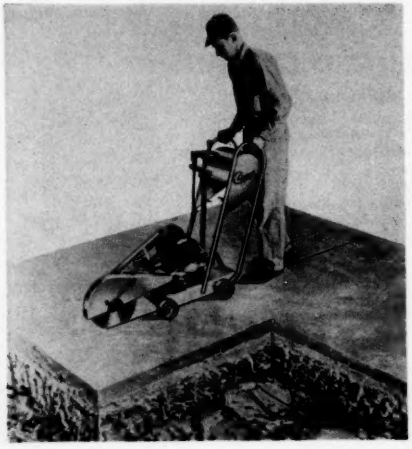
New Grating Provides Non-Skid and Firm Grip

A NEW iron grating has been introduced by The Bustin Iron Works, Inc., New York, which provides non-skid and firm grip quality for all industrial uses where excessive oil, grease, water, and icy conditions make walking and working hazardous, and where drainage and sanitation are desirable factors. It is especially adaptable for platforms, stair treads, ramps, catwalks, running boards, skidmats, steps for trucks, trailers, submarine docks, ladder rungs, ships, railroad industry, machine treadles, engine rooms, etc.



Iron grating made by Bustin Iron Works

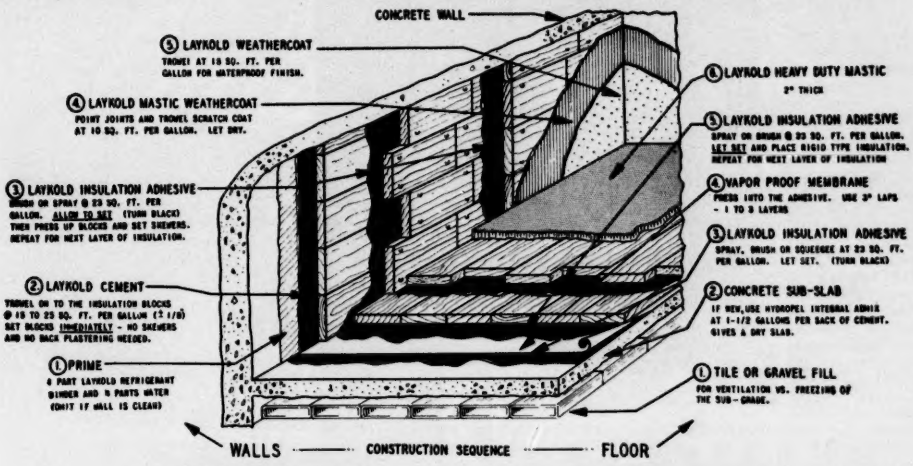
Portable Concrete Saw Cuts Into Slab of Concrete



CONCRETE floors and asphalt can now be sawed fast and easy to provide straight, smooth edges before breaking. Clipper Manufacturing Company has just announced three new portable concrete saws. Users have proven that concrete sawing is completely practical and economical on the the smallest patch job. The cutting speed is 12 feet per minute in asphalt, and up to 5 feet per minute — 1 inch deep—in limestone concrete. The maximum depth of cut is 6½ inches.

Laykold DATA SHEET No. 1

How to HOLD Insulation on an EXISTING CONCRETE Wall and Floor

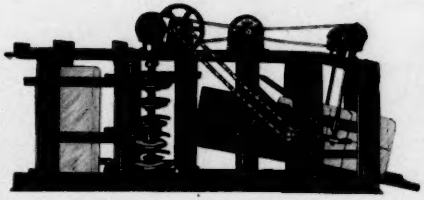

CONCRETE WALL
5 LAYKOLD WEATHERCOAT
TROWEL AT 15 SQ. FT. PER GALLON FOR WATERPROOF FINISH.
4 LAYKOLD MASTIC WEATHERCOAT
POINT JOINTS AND TROWEL SCRATCH COAT AT 10 SQ. FT. PER GALLON. LET DRY.
3 LAYKOLD INSULATION ADHESIVE
BRUSH OR SPRAY @ 25 SQ. FT. PER GALLON. ALLOW TO SET (TURN BLACK) THEN PRESS UP BLOCKS AND SET SHEWERS. REPEAT FOR NEXT LAYER OF INSULATION.
2 LAYKOLD CEMENT
TROWEL ON TO THE INSULATION BLOCKS @ 15 TO 25 SQ. FT. PER GALLON (2 1/8) SET BLOCKS IMMEDIATELY - NO SHEWERS AND NO BACK PLASTERING NEEDED.
1 PRIME
4 PART LAYKOLD REFRIGERANT BINDER AND 1 PARTS WATER (ONLY IF WALL IS CLEAN)
6 LAYKOLD HEAVY DUTY MASTIC
2" THICK
5 LAYKOLD INSULATION ADHESIVE
SPRAY OR BRUSH @ 25 SQ. FT. PER GALLON. LET SET AND PLACE RIGID TYPE INSULATION. REPEAT FOR NEXT LAYER OF INSULATION
4 VAPOR PROOF MEMBRANE
PRESS INTO THE ADHESIVE. USE 3" LAPS - 1 TO 3 LAYERS
3 LAYKOLD INSULATION ADHESIVE
SPRAY, BRUSH OR SQUEEGEE AT 25 SQ. FT. PER GALLON. LET SET. (TURN BLACK)
2 CONCRETE SUB-SLAB
IF NEW, USE HYDROPEL INTEGRAL ADMIX AT 1-1/2 GALLONS PER SACK OF CEMENT. GIVES A DRY SLAB.
1 TILE OR GRAVEL FILL
FOR VENTILATION VS. FREEZING OF THE SUB-GRADE.
WALLS
CONSTRUCTION SEQUENCE
FLOOR

In the West **STANCAL ASPHALT & BITUMULS COMPANY**
200 BUSH STREET • SAN FRANCISCO 4, CALIF.
Los Angeles, Calif. • Oakland 1, Calif.
Portland 4, Ore. • Seattle, Wash. • Tucson, Ariz.

In the East **AMERICAN BITUMULS COMPANY**
200 BUSH STREET • SAN FRANCISCO 4, CALIF.
Baltimore 3, Md. • Perth Amboy, N. J. • Columbus 16, O.
St. Louis 17, Mo. • E. Providence 14, R. I. • Mobile, Ala.

★ PERFECTION ★

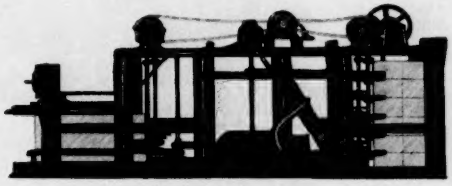
A GREAT NAME IN ICE SCORING MACHINES!



A scorer should do more than merely score ice . . . .

← PERFECTION REGULAR

Receives ice block standing on end, scores it, and delivers on edge. Capacity 6 blocks per minute. Reduce labor, increase profits.



PERFECTION SPECIAL →

Receives ice blocks on edge, scores and delivers blocks on end, ready to store in vault. Capacity 4½ blocks per minute. Labor saved is money made.

QUICK DELIVERY!

Write—Wire or Phone

PERFECTION ICE SCORING MACHINE CO.

P.O. Box 2140 • Fort Worth, Texas • Phone EDison 1258

New Pocket pH Meter and Companion Probe Unit

A POCKET-size pH meter and companion probe unit, now available, permits on-the-spot pH determinations anywhere. Completely self-contained with batteries, in a bakelite case 3 x 5⅞ x 2½ in., this instrument is furnished in a case with tubes of buffer and KCI solutions. Total weight is 3 lbs. Both water-proof andfungus-proof, the case comes with a combination hand-and-shoulder strap, allowing the instruments to be slung over the shoulder or hung around the neck leaving both hands free.

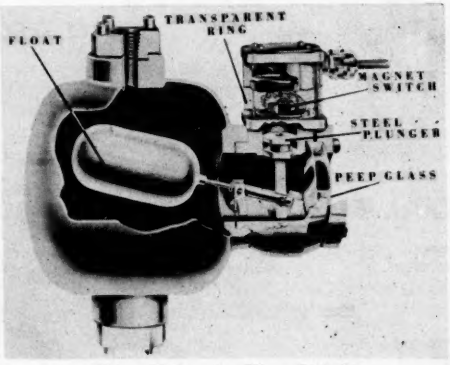
New pH Meter and Probe Unit

Supports and beakers are eliminated by combining the calomel and glass electrodes with the sample holder, in a single polyethylene probe unit. This idea of combining the sample holder with the electrodes (Patents Pending) completely protects them and requires a sample volume of only 0.5 ml.

The meter is scaled from 2 to 12 pH for easy reading, and a simple adjustment gives readings from 0 to 14. Accuracy of 0.1 pH is obtainable. Hearing-aid type batteries provide up to 1300 hours of operation. The electrometer tube, switch and input connector are sealed in a single unit to insure freedom from high humidity difficulties. The one-knob control and continuous reading features of this instrument simplify operation for untrained personnel. Grounded samples can be directly measured because of no external power connections. The instrument and electrode are completely shielded.

New Float Switch Has Visual Features

A NEW refrigerant float switch known as the MS Float Switch has been developed by Mojonnier Bros. Co., Chicago, to meet the need for a switch which will closely control the ammonia or Freon liquid level in evaporators, and, at the same time, include a peep glass to show the refrigerant level.

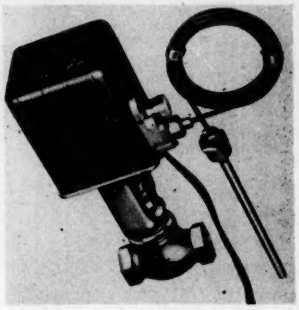


New Mojonnier Float Switch

The switch works on a new indirect magnetic system. A stainless steel float in the refrigerant operates a steel plunger which in turn actuates an externally mounted magnetic switch. This magnet switch is housed in a transparent ring member. This transparent ring member is a pressure proof, water tight housing, making the switch especially adaptable to operation under wet conditions and for use on sub-zero applications.

Temperature Regulator

NEW temperature regulators have been designed by Barber-Colman, described as tight closing, ruggedly constructed, self-contained units. They offer the installation advantages of a self-contained controller with the additional features of a clearly marked, calibrated, adjusting dial to give exact setting in degrees Fahrenheit. Available in two styles ½ in. through 4 in. They are shipped completely assembled. No assembly, linkage, or adjustment is necessary either before or after installation—except for the simple setting of the control dial to the desired temperature. Wiring is a simple two-wire connection to any 115-volt or 230-volt AC circuit.



Barber-Coleman temperature regulator

Plexiglass Curtain Saves Cooling Load

A SAVING of one-third in the cooling requirement of a Boston bowling alley was effected by hanging a four-foot Plexiglass curtain from the ceiling between the public area and the alley area, it was reported by Anthony Erbetta, of the Boston Air Conditioning Company, who designed and installed the system.

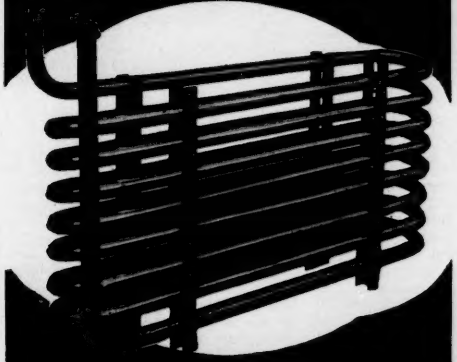
Load calculations for a 14-alley section of the Lucky Strike Bowladrome showed a 15-ton cooling requirement for a 15 degree temperature drop. However, use of the curtain along the full width of the alleys at the foul line to obstruct the flow of cold air over the alleys enabled the contractor to guarantee the design conditions with a 10-ton United States Air Conditioning Corporation Refrigerated Kooler-aire packaged unit.

Ducts above the ceiling carry the cool air to six 670 cfm three-directional diffusers, spaced at ten foot intervals, four feet in front of the Plexiglass curtain.

The usAIRco equipment, which contains a built-in evaporative condenser for water conservation and a steam coil for winter heating, was installed against the outside wall of the building.

Coils

Smooth Bends
Perfect Welds
Exact Measurements



For over sixty years, the National Pipe Bending Coils have proved their quality in Ice and Refrigeration plants.

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Calcium Chloride

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BRINE MEDIUM

that...

- Provides a "long-life" brine . . . lowest cost in long run
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DEALERS AND WAREHOUSE STOCKS IN PRINCIPAL CITIES

FREE BRINE MAINTENANCE CHART available—mail coupon for your copy.

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SOLVAY SALES DIVISION, Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

Please send me one of your free Brine Maintenance Charts. I understand there is no obligation on my part.

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Company_____

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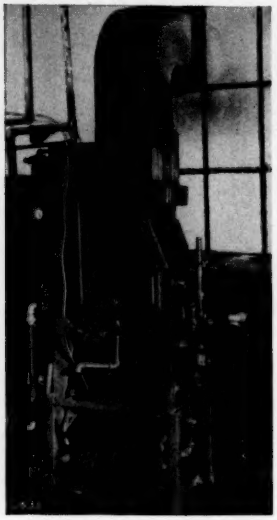
City_____ Zone____ State_____ 56-3

Niagara Blower Introduces No Frost Spray Cooler

THE Niagara Blower Company has introduced new, improved "No Frost" equipment for refrigerating cold test rooms, cold processing, such as the quick freezing of foods, and for food products chilling and cold storage.



New No Frost Spray Cooler made by Niagara Blower Co.

The equipment consists of the Niagara spray cooler which provides a controlled cold air stream at sub-zero temperatures by means of passing air over refrigerated coils that are prevented from accumulating ice or frost by a constant spray of Niagara "No Frost" liquid, a non-freezing compound. In order to keep this process automatic and continuous, the non-freezing liquid is maintained in a concentrated condition by constantly removing the moisture that is condensed out of the atmosphere by contact with the refrigerated spray. This is done in the Niagara "No Frost" concentrator, now improved by the adoption of a completely new method with newly designed apparatus.

A portion of the No Frost solution, as it is continuously being diluted by the condensation of water vapor in the spray cooler is pumped to the concentrator. Here the water is removed by evaporation. The diluted solution is sprayed in a chamber through which air is drawn by fans. A heating element raises the temperature of the air, promoting the evaporation of the water, which evaporates at a much higher rate than the No Frost liquid by reason of vapor pressure differences. In a second stage of re-concentration, located above the spray nozzles, the air stream, which now contains the evaporated water vapor and some No Frost liquid vapor, is cooled by a reflux coil. This, by increasing the relative humidity of the air stream, forces the condensation of the No Frost liquid vapor. The re-concentrated No Frost solution is returned to the spray cooler.

The new concentrator replaces older types in which the water was removed by heating above the boiling point. It has the advantages of operating at lower temperature, increased capacity in smaller space with more compact equipment, easier maintenance, easier and more trustworthy operation with less attention and shut-down time for cleaning. With the spray cooler and concentrator in combination, the "No Frost Method" equipment permits refrigeration to temperatures as low as –30 F. without interruption for defrosting. From this point additional refrigerant coils may be used to obtain extreme low temperatures. There is no loss of effectiveness that is common to all refrigeration systems where frost progressively accumulates on refrigerant coils.

The new concentrators will be manufactured in a wide range of sizes with water evaporating capacities ranging from ½ gallon to 75 gallons per hour. A single large concentrator will serve a battery of several large spray coolers.

New Compound Prevents Pipe Thread Seizure

SEIZURE of pipe, bolt and stud threads and gasket faces has presented an obstinate problem. A new metallic compound which combines the advantages of a lubricant and sealer to solve this problem has been developed by Armite Laboratories of Los Angeles. It is an anti-seize compound known as Led Plate. It can be used with effective results with temperatures from minus 350 F. to plus 2900 F or even higher, according to the manufacturer.

Applying Led-Plate to pipe thread

The metallic elements, of which over 70 percent is powdered lead, are held in suspension in hydrocarbons, and the materials will not dry out according to the manufacturers. This advantage insures later disassembly against seizure. No graphite is used. The compound can be used for steam, gas, water, air, oil, ammonia and various chemical connections. It conforms to Government specifications. A sample tube will be sent to inquirers upon request. Armite Laboratories are located at 6671 Broad Street, Los Angeles 1, Calif.

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ICE DEALERS SUPPLIES

Only the Highest Quality Merchandise and efficient service necessary for the proper and profitable operation of your business. Write for our 1951 catalog.

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LA PORTE, INDIANA

CEMCO

Double Gig Ice Hoist
Fast - Sturdy - Dependable -

Send for details

THE CAPITAL ELEVATOR & MFG. CO.
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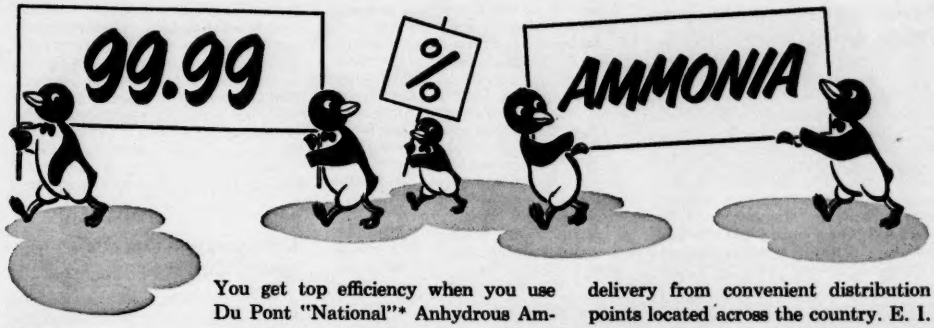
Columbus 8, Ohio



You get top efficiency when you use Du Pont "National"* Anhydrous Ammonia in your plant. It's always uniform, dry and dependable. You'll get quick delivery from convenient distribution points located across the country. E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Wilmington 98, Del.

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WILMINGTON, DELAWARE

...also Distributors of "Artic" Methyl Chloride... Sulphur Dioxide... Kinetic "Freon"

FAST, ECONOMICAL CRUSHER SAVES TIME, LABOR COST!

The new and fast-operating "Little Chief" Ice Crusher by Bateman has three grate adjustments and will grind a 25-pound block of ice into fine ice in 12 seconds; into medium ice in 8 seconds, and into coarse ice in only six seconds.

It holds snow to an absolute minimum, is galvanized and has a chute for filling bags. It is simple—and dependable. There are no gears since drive is direct from two-groove flywheel.

Because of high grinding speed, the "Little Chief" operates from a ¾ H.P. motor. If desired, motor will be provided at prevailing price.

ONLY

$149.00

Less Motor
FOB Mineral Wells

WRITE TODAY FOR FULL INFORMATION

Bateman

Ice Processing Equipment

MINERAL WELLS, TEXAS

ACME... *the Only Gas Mask With the* 'PICTURE WINDOWS'

You never have that "jammed-in" feeling, wearing the Acme Full-Vision Gas Mask. Its patented, larger lenses are like picture windows, giving you full natural vision for that safe, unconfined feeling. When you walk, you can actually see your toes without bobbing your head. This factor alone makes Acme outstanding among gas masks . . . well worth looking into.

Write for the complete story on Acme Gas Masks for
Write for the complete story on Acme Gas
Masks for The Refrigeration Industry

Acme Protection Equipment Co.

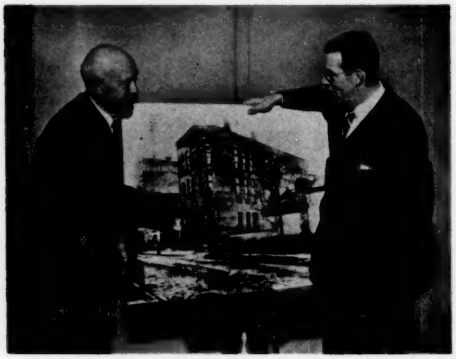
3037 West Lake Street, Chicago 12, Illinois

Taylor Instrument Observes 100th Anniversary

THE year 1951 marks the 100th birthday of the Taylor Instrument Companies of Rochester, N.Y. Starting as a tiny partnership for making household thermometers and barometers, the business of Kendall & Taylor showed an inventory in 1851 listing total assets of $919.00, of which $600.00 was for "knowledge of the business." The company has since become a multi-million dollar corporation manufacturing some 8,000 variations of its basic products and distributing them all over the world.

George Taylor came from Stoddard, New Hampshire, and opened his business at the age of 19. His original journal, now in the company's archives, reveals him as a meticulous young man who made his entries in shillings and pence after the fashion of New Englanders who kept the old British monetary system long after the rest of the country had changed to dollars and cents.

Although instruments for consumer use comprise the oldest part of the present Taylor line, by far the largest is the industrial instrument division, which began in 1896 with the acquisition of a firm making mercury-in-glass industrial thermometers for use on such batch processes as brewing, varnish making and printing ink. In 1905, the first controllers were added to the industrial line, an event which marked a highly significant turning point in the flowering of continuous industrial processing in this country.



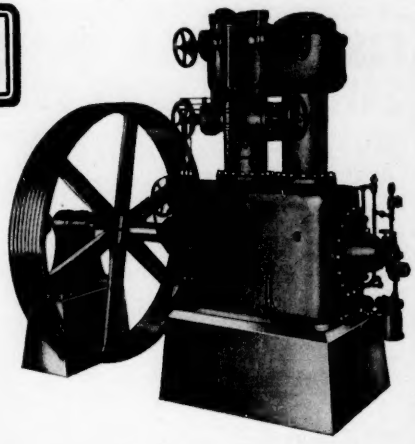
John Thompson, who retired in 1950 after 65 years' continuous service with Taylor instrument companies, shows Raymond E. Olson, vice-president and sales manager where he used to work in old building.

Refrigeration Speeds Metal Cutting

OUTPUT from metalworking automatic machines is being increased 25 to 50 per cent by installation of new refrigeration equipment for cooling cutting oils used in tool operations, it has been announced by B. S. Williams, president of the B. S. Williams Company, Inc., Mount Vernon, N. Y.

Developed partly as a result of tests completed during the last war, the new refrigerating devices enable machine operators to hold a predetermined temperature on cutting tool tasks over long periods of time, Mr. Williams pointed out. Errors due to temperature variation are substantially reduced, thereby eliminating much time for making adjustments.

Sterling DEPENDABLE REFRIGERATION



The phrase "STERLING DEPENDABLE REFRIGERATION" is more than a slogan—it's a fact.

Built with rugged strength for endurance, with advanced design for efficiency and economy of operation, STERLING Ammonia Compressors are the product of more than fifty years of "know how" in the manufacturing of refrigeration machinery and equipment.

A complete range of sizes insures the correct compressor for each application.

Deliveries are, at present, current—most models of compressors are available from stock.

For complete information, see your nearest STERLING distributor, or write the factory.

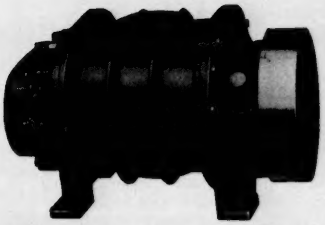
REYNOLDS MANUFACTURING CO.

SPRINGFIELD *"Builders of Fine Refrigeration Equipment"* **MISSOURI**

LOOKING FOR V·P·L ?

To be sure of air supply in constant Volume at required Pressures and low power cost, specify R-C Rotary Positive Blowers. Available in any required sizes, with varying capacities to fit your loads, R-C Blowers will give you many years of dependable, economical performance. Ask us about your needs or write for free Bulletin R-C 1247.

Roots-Connersville Blower Corporation
510 Columbia Avenue, Connersville, Indiana



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ONE OF THE DRESSER INDUSTRIES

INCREASE YOUR PROFITS
Happy Says—
YOUR PROFITS JUMP WITH—

"HAPPY" ICEMAN prefers
MASTER POINT ICE PICKS

MASTER POINT ICE PICKS
SOLD THRU THE NEW
"TAKE-A-PICK" MASTER POINT PICK VENDOR
WRITE OR WIRE
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Philadelphia Pipe Coils

ESTABLISHED 1880
Continuous Welded Pipe Coils of Any Metal, Size or Design
PHILADELPHIA PIPE BENDING CO.
FIFTH STREET & N. P. R. R.
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LITTLE GIANT
ICE BREAKERS
Truck Model—Gas Engine Driven
INCREASE YOUR PROFITS BY DELIVERING FRESHLY BROKEN ICE IN SIZES FOR ALL NEEDS RIGHT AT THE DOOR

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- Diamond Point Picks
- Easy Starting Briggs & Stratton Engine

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DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ Saves Space
★ Saves Weight
★ Saves Cost

CAN BE USED WITH ANY REFRIGERANT
SALES AGENCIES SOLICITED

Manufactured by
DETROIT ICE MACHINE COMPANY
2615 Twelfth St., Detroit 16, Mich.

DIMCO Fin Coils solve low headroom problem
View of Mezzanine Lard Storage Room
Peters Sausage Company, Detroit, Mich.

MANUFACTURERS' NEWS

Specification Sheet on Cold Liquid Chiller

A NEW two-page, two-color specification sheet is now available on the Acme Flow Cold Liquid Chiller. The sheet illustrates the single and dual compressor units and also shows the finned coils, convectors and cooling towers which Acme manufactures. Specifications, dimensions and weights are given as well as additional ratings for all models. Tabulation of performance at 40, 46 and 50 F water off is also given. Copies are available, from any Acme representative or direct from the factory.

Worthington Breaks Ground For New Plant

GROUND has been broken at Succasunna, N. J., for a vertical turbine pump plant of Worthington Pump & Machinery Corp. About 50 local residents, Worthington friends, and customers in New Jersey attended the gathering which was presided over by E. J. Schwanhausser, executive vice president. C. E. Wilson, vice president in charge of sales of vertical turbine pumps, initiated the ground-breaking ceremony.

The one-story building, measuring 80x200 feet, will contain several bridge-type traveling cranes and will

Architect's drawing of Worthington's new Succasunna Plant

be used primarily for warehousing and assembly work. Small capacity machining facilities will be used at the start. There will be an engineering room, as well as a test stand for simulating field conditions to check the mechanical and hydraulic phases of the equipment prior to shipment. Features of the plant will be a 35,000-square-foot macadam loading area on the north and west sides of the building. A siding will be run from the nearby Lackawanna Railroad tracks along the east side of the building. It will be known as the Succasunna works of the Worthington Corp.

Dearborn Chemical Moves

DEARBORN Chemical Company Chicago, manufacturer of No-Ox-Id rust preventives and industrial boiler feedwater treatment, moved into new and modern air-conditioned offices in the Chicago Merchandise Mart April 16. President Robert A. Carr announced that the expansion, brought about through increased business and the need for extended customer service, will add an additional 5,000 square feet of office space.

Easier and Cheaper with

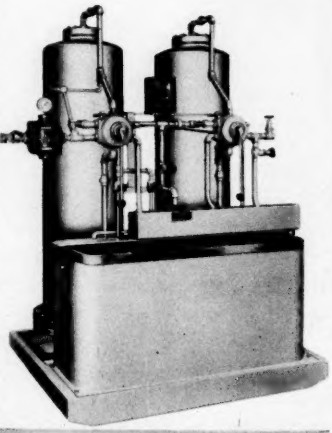
INDUSTRIAL Water Demineralizer

It's worth looking into . . .

The demineralization of water is not something new. It is used in the food industry, in the chemical and other industrial processing where chemically pure water is used in quantity. The very low cost warrants your looking into it.

Here are some of the advantages you get with an INDUSTRIAL demineralizer in ice making. Since the dissolved mineral salts in ordinary water are removed in passing through the ion-exchange resins, core-water removal and replacement is unnecessary. Losses due to cracking are greatly reduced. Freezing at the lower brine temperature increases daily yield. And the bulk of the cake of ice is clearer—your customers will notice that.

If you will send us an analysis of the water you are using, the quantity you need, and at what rate (gallons per hour) we will send you information on INDUSTRIAL demineralizers, estimate of costs, performance data, etc. Better do it now.



A typical two-bed INDUSTRIAL Water Demineralizer. Standard models available with capacities up to 1000 gph. Special units of any capacity engineered to requirements.

FILTERS Pressure Type · PUMPS Centrifugal · CORROSION TESTING APPARATUS Salt Fog • Humidity

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Chicago 50, Illinois

RUBBER DIVISION Vulcanized Linings • Molded Products

WATER DEMINERALIZERS

How to HOLD INSULATION on an EXISTING CONCRETE WALL or FLOOR

See page 71

QUALITY COILS FOR *ALL* APPLICATIONS

WELDED HEADERS, PIPE BENDS AND AMMONIA RECEIVERS

Whether your next job be for a single bend, or coil or complete piping system, Chicago Nipple can supply your requirements. Experienced workmen, practical engineers, and modern equipment reflect the quality of our products.

Coils are of selected ammonia pipe—all joints are electrically welded—checked under water with an air pressure of 300 pounds to guarantee tightness.

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64 Frequently Used Tables
125 Pages of Text
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The Accepted Vest Pocket Reference for Refrigeration Men

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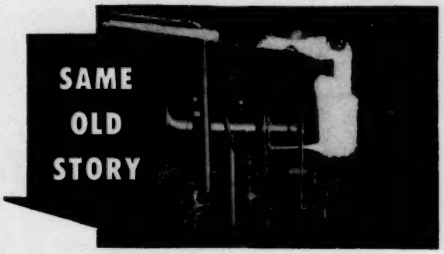

POWER SAVINGS amounting to approximately $275 per month
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REFRIGERANT SAVINGS of $255 in 6 months . . .
— Velvet Freeze Ice Cream, Kansas City, Missouri
PLANT CAPACITY INCREASED 6% by reducing head pressure 25 lb.
— Crystal Ice Service, Inc., New Orleans, La.
WATER SAVINGS OF 45,000 gallons per day . . .
— U. S. Industrial Chemicals, New Orleans, La.

• • •

IT'S the same old story but somehow never monotonous. Reports like these are usual, typical, every day. It's the Armstrong Purger and the above are its main benefits. This Purger removes air and other non-condensables from refrigerating systems . . . and thereby accomplishes some fancy cost cutting. For full details on

HOW TO SAVE TIME . . . WORK . . . MONEY

SEND FOR BULLETIN 192

ARMSTRONG MACHINE WORKS
860 Maple Street • Three Rivers, Michigan

Steam Baked Reliable TRADE MARK Corkboard

- **30 years serving the Refrigeration, Cold Storage, Meat Packing Industries, and Ice Plants.**
- **Prompt shipments anywhere.**
- **Your inquires invited!**

LUSE-STEVENSON CO., INC.
879 Blackhawk Street
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DISTRIBUTORS WANTED

Martocello Appointments

THE appointment of five firms as sales and service representatives is announced by Jos. A. Martocello of Philadelphia, Pa. All of them are well known in the territories covered by their men.

G. H. Voter Co., 310 Congress Street, Boston, Mass., will cover the ice manufacturing field in Maine, New Hampshire, Vermont, Massachusetts and Rhode Island. "George" Voter is well known throughout the trade in New England.

Dowd-Cronin Associates, 20 Vesey Street, New York City, will represent Martocello in Connecticut, New Jersey, Delaware, Maryland and Eastern Pennsylvania.

N. E. Harris, 914 N. Second Avenue, Tucson, Arizona, has the states of Arizona, New Mexico and Western Texas.

Western Ice Equipment Co., 420 Market Street, San Francisco, will cover the three Pacific states, Washington, Oregon and California.

Virginia, North Carolina and South Carolina comprise the territory which will be covered by J. P. Carlisle Company of Greensboro, North Carolina.

Joseph B. Cadwalader, general manager and executive head of Jos. A. Martocello & Co., stated that these appointments are in line with their policy of securing highest-type representatives to give local, personal service on Martocello products to the ice industry.

S & S Expands

A BULLETIN issued by the S & S Vending Machine Company announces two new shipping points and a regional and branch office. In addition to San Jose, Calif., S & S Stations are now built at Morrison, Ill., and Hagerstown, Md. Sales offices are now maintained at San Jose, Calif., by Don Scott, sales manager; at Arlington, Va., by D. A. Prager, regional manager; and at a branch office to be established in the midwest. A revised price list has been issued which shows material reductions on ice vending equipment. This reduction, it is stated, is due to increased production, a fortunate materials situation and other factors. The company has announced a financing plan for the purchase of vending equipment.

Crapeau Heads Foreign Trade Committee

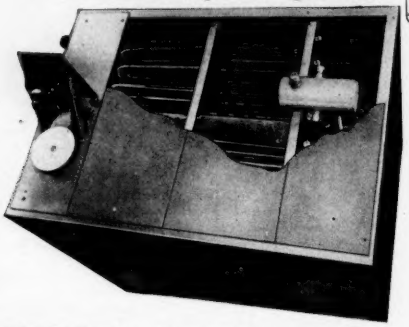
AT A RECENT meeting of the Foreign Trade Committee of the Air Conditioning and Refrigerating Machinery Association, Ken L. Crapeau, export sales manager of Chrysler Corporation's Airtemp Division, was elected Chairman. C.E. Renninger sales manager, International Division, York Corporation, was elected vice-chairman.

The Foreign Trade Committee of ACRMA, comprising the export representatives of the principal manufacturers of commercial and industrial refrigeration and air conditioning machinery has completed one of the most successful periods of its more than fifteen years' operation. W. J. Neylan, supervisor, Commercial Refrigeration, International Division, Servel, Inc., preceded Crapeau as chairman of this active group of refrigeration and air conditioning exporters.

CP Compact Ice Builder

to Cut Refrigerating Costs

STORES COLD



REFRIGERATES with Sweet Water!

With a CP Compact Ice Builder you actually build up low cost refrigeration during light-demand periods to use as you require during heavy demand cycles! You reduce peak load electrical demands on which a portion of most power rates are based. You insure flexibility and highest efficiency of operation with a "reservoir" of refrigeration that you can distribute hour to hour to meet your changing needs. You are practically insured against shutdown resulting from compressor failure! "Stored Cold" is built up in the form of ice on the coils of the CP Compact Ice Builder. Melting down to 33° sweet water, it is circulated to plate coolers, tanks and other equipment using sweet water. By its very nature it is one of the most efficient and economical refrigerating methods!

There's a CP Ice Builder for every need—factory-built in capacities of 1000 to 21,000 lbs.; custom built in your plant in larger capacities. Capacities to 4,000 lbs. for Ammonia or Freon; larger sizes Ammonia only.

THE Creamery Package MFG. COMPANY
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Get the full savings and efficiency story today. Mail the coupon for *new free bulletin!*

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Name.....

Company.....

Address.....

City.....*Zone*....*State*.....

How to HOLD INSULATION on an EXISTING CONCRETE WALL or FLOOR

See page 71

THE BUYERS DIRECTORY

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ABSORBERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

AIR AGITATING SYSTEMS AND FITTINGS
Ice Plant Equipment Co., Inc. Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

AIR COMPRESSORS
Frick Co., Waynesboro, Pa.

AIR CONDITIONING EQUIPMENT
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Niagara Blower Co., New York, N.Y.

AMMONIA COMPRESSOR VALVES
Frick Co., Waynesboro, Pa.

AMMONIA COMPRESSORS
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA CONTROL DEVICES
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.

AMMONIA FLOAT VALVES
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesvoro, Pa.
Phillips & Co., H. A., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA MANUFACTURERS
Armour Ammonia Div., Armour & Co., Chicago, Ill.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bower Chemical Mfg. Co., Henry, Philadelphia, Pa.
du Pont, Polychemicals Dept., Wilmington, Delaware

AMMONIA MASKS
Acme Protection Equipment Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

AMMONIA PURIFIERS
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA RECEIVERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. F., Ridgefield Park, N. J.
National Pipe Bending Co., New Haven, Conn.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

AMMONIA VALVES & FITTINGS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc. Chicago, Ill.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

ARCHITECTS AND ENGINEERS
Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

ASPHALT PRODUCTS
American Bitumuls Co. San Francisco, Calif.

AUTOMATIC CONTROL DEVICES
Alco Valve Co., St. Louis, Mo.
Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Phillips & Co., H. A., Chicago, Ill.

BAGS, ICE
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Index Coupon & Supply Co., La Porte, Ind.
International Paper Co., New York, N. Y.
Union Bag & Paper Corp., New York, N. Y.
United Ice & Oil Supply Co., Boston, Mass.

BAGS, WATERPROOF PAPER
Index Coupon & Supply Co., La Porte, Ind.
International Paper Co., New York, N. Y.
Union Bag & Paper Co., New York, N. Y.

BEER COOLERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BLOWERS
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

BOILERS
Frick Co., Waynesboro, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

BOILER TUBES
Byers Co., A. M., Pittsburgh, Pa.

BOOKS—TECHNICAL
Nickerson & Collins Co., Chicago, Ill.

BRINE CIRCULATORS
Creamery Package Mfg. Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Roots-Connersville Blower Corp., Connersville, Ky.

BRINE COOLERS
Acme Industries, Inc., Jackson, Mich.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

BRINE SPRAY COOLING
Acme Industries, Inc., Jackson, Mich.
Frick Co., Waynesboro, Pa.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Martocello & Co., Jos. A., Philadelphia, Pa.

BRINE TREATMENT
Chemical Solvent Co., Birmingham, Ala.

CALCIUM CHLORIDE
Solvay Sales Div., Allied Chem. & Dye Corp., New York, N. Y.

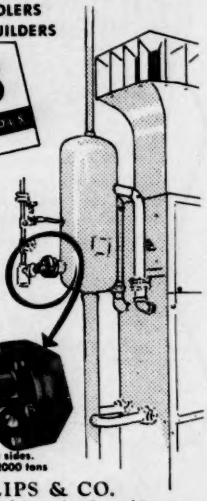
CAN DUMPS
Frick Co., Waynesboro, Pa.
Gifford-Wood Co., Hudson, N. Y.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.

(Buyers Directory continued on next page)

How to assure
MAXIMUM B.T.U. TRANSFER
in "Packaged" Cooling Units

AIR COOLERS • WATER COOLERS
SHARP FREEZERS • ICE BUILDERS

Use
PHILLIPS
FLOAT CONTROLS



Instant response to wide variation in load is one major reason why the use of Phillips Float Controls contributes to high heat transfer efficiency in practically all cooling units. In addition, you gain maximum flexibility with a fewer number of valves to carry in stock because Phillips No. 300 and No. 301 Valves provide capacities of 2 to 50 tons for handling a majority of applications with the same mounting.

For complete satisfaction in Float Controls and Regulating Valves, combined with efficient engineering service help—willingly given—call on Phillips.

No. 300 and 301 Valves have Cartridge Construction: Direct Feed—7 orifice sizes; Remote Feed—8 orifice sizes.

Other Control Valves for high or low sides. Freon: 1 to 1000 tons, Ammonia: 1 to 2000 tons

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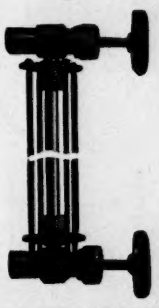
3255 W. CARROLL AVE. • CHICAGO 24, ILLINOIS

SHANK
REFRIGERATION PRODUCTS

Provide maximum service under toughest operating conditions.



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RELIEF VALVES
For Ammonia and Freon. One piece body design—rustproof finish. Internal construction — stainless steel — will not corrode. Positive relief action. Pressures from 75 to 400 lbs.

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The installation of a Layne Well Water System is your guarantee of an abundant water supply with the lowest possible operating cost. The extra durability built into all Layne equipment assures you of dependable performance with little attention and practically no upkeep. For further information, catalogs, etc. address

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WELL WATER SYSTEMS
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Pipe Coils
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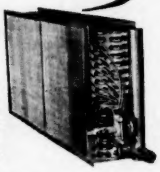
***For* Refrigeration, Air Conditioning, Heating**



Coils and Bends of any Metal, Size or Design. Engineered to your requirements. Designed and Built for longest life and the least maintenance.

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THE BUYERS

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Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
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Ohio Galvanizing & Mfg. Co., Niles, Ohio
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

CAR ICING EQUIPMENT
Capital Elevator & Mfg. Co., , Columbus, Ohio
Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.
Tri-Pak Machinery Service Inc., Harlingen, Texas

CHEMICALS
Barada & Page, Inc., Kansas City, Mo.

COILS
Acme Industries, Inc., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Nipple Mfg. Co., Chicago, Ill.
Creamery Package Mfg. Co., Chicago, Ill.
Detroit Ice Machine Co., Detroit, Mich.
Howe Ice Machine Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

COLD STORAGE CONSTRUCTION
Armstrong Cork Co., Lancaster, Pa.
Frick Co., Waynesboro, Pa.

COLD STORAGE DOORS
Butcher Boy Cold Storage Door Co., Chicago, Ill.
Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Jamison Cold Stge. Door Co., Hagerstown, Md.
Refrigeration Engineering Co., Montgomery, Minn.

COMPRESSORS
(See Ice Making and Refrigerating Machinery)

CONDENSERS
Acme Industries, Inc., Jackson, Mich.
Creamery Package Mfg. Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., Ridgefield Park, N. J.
King-Zeero Co., Chicago, Ill.
National Pipe Bending Co., New Haven, Conn.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Rempe Company, Chicago, Ill.
Reynolds Mfg. Co., Springfield, Mo.
Vogt Machine Co., Henry, Louisville, Ky.

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Greene, Van R. H., New York, N. Y.
Ophuls & Associates, Fred, New York, N. Y.

CONVEYORS
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Gifford-Wood Co., Hudson, N. Y.
Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.

COOLING TOWERS
Frick Co., Waynesboro, Pa.

CORK INSULATION
Armstrong Cork Co., Lancaster, Pa.
Luse-Stevenson Co., Inc., Chicago, Ill.

CORROSION CONTROL
Wright Chemical Control Corp., Chicago, Ill.

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Index Coupon & Supply Co., La Porte, Ind.
United Ice & Oil Supply Co., Boston, Mass.
Vivian Mfg. Co., St. Louis, Mo.

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Martocello & Co., Jos. A., Philadelphia, Pa.
Ohio Galvanizing & Mfg. Co., Niles, Ohio
Vogt Machine Co., Henry, Louisville, Ky.

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Lilly Co., The, Memphis, Tenn.
Link-Belt Co., Chicago, Ill.

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(See Architects and Engineers)

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Frick Co., Waynesboro, Pa.
Niagara Blower Co., New York, N.Y.
Rempe Company, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.

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Howe Ice Machine Co., Chicago, Ill.
Rempe Company, Chicago, Ill.

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Howe Ice Machine Co., Chicago, Ill.

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Knickerbocker Stamping Co., Parkersburg, W. Va.

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Ice Plant Equipment Co., Inc., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.

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Union Bag & Paper Corp., New York, N. Y.

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Link-Belt Co., Chicago, Ill.

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Knickerbocker Stamping Co., Parkersburg, W. Va.
Ohio Galvanizing & Mfg. Co., Niles, Ohio

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Knickerbocker Stamping Co., Parkersburg, W. Va.
Martocello & Co., Jos. A., Philadelphia, Pa.
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Vogt Machine Co., Henry, Louisville, Ky.

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Link-Belt Co., Chicago, Ill.
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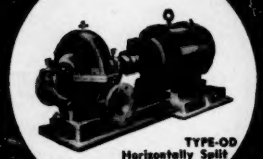

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Condensers, brine coolers, cranes, can dumps, can fillers, etc. Send us your requirements on any equipment you may need.

B & E REFRIGERATING CO.
2 Orange St., Newark 2, N. J.
Phone: Mitchell 3-7790 Cable address "BERECO"

USED ICE MACHINES AND EQUIPMENT

All Used Equipment Is Reconditioned In Our Modern Machine Shop
THIS IS ONLY A PARTIAL LIST-WRITE ABOUT ANY REQUIREMENTS WHICH YOU HAVE
WE ARE BUYING ADDITIONAL EQUIPMENT ALL OF THE TIME

Compressors With or Without Motors — Item No.

1—4x4 York, 300 RPM — 16
6—6x6 York's, 200 RPM — 20
1—6x6 Frick, 257 RPM — 21
2—6x6 York's, 400 RPM, forced-feed lubrication — 25
2—6½x6½ Arctics, 350 RPM, forced feed lub. — 30
1—7¼x7¼ Baker, 350 RPM, forced feed lubrication — 35
1—7x7 Frick, 200 RPM — 40
1—7½x7½ York, 200 RPM — 51
2—7½x7½ Yorks, 350 RPM, forced-feed lubrication — 54
1—7½x7½ York, 400 RPM, forced-feed lub. Late Type — 55
1—8x8 Frick, 400 RPM forced feed lub. V-belt wheel — 57
1—8x8 York, 400 RPM, forced feed lub., V-belt wheel — 58
1—9x9 Arctic, 300 RPM, forced feed lub. — 62
1—9x9 York, 200 RPM — 71
1—9x9 Worthington, 325 RPM, forced feed lub. — 72
1—10x10 De La Vergne, 360 RPM, forced feed lub. — 73
1—10x10 York, 257 RPM, forced feed lub. — 80

Item No.

1—10x10 Carbondale, 100 HP synch. motor, 350 RPM — 81
3—10x10 York's, 223 RPM, semi-forced feed lub. — 82
1—10x10 Frick, direct connected 100 HP Sync. Motor — 84
1—10x10 York, direct connected 100 HP Sync. Motor — 86
1—11x13 York, 164 RPM, forced feed lub. — 90
2—12x12 Frick, direct conn. 150 HP synch. motor — 98

Diesel Driven and Diesel Engines
1—8x8 York—Direct connected to 50 HP Fairbanks-Morse at 257 RPM — 210

Steam Driven
1—8x8 Vertical York, 300 RPM direct connected — 327

Pipe
10,000 feet wrought Iron pipe—2"—like new — 451

Complete Ice Plants
1—15-ton electric driven plant — 630
1—600 Can Trunk Coil Type—York Plant, Brand New Tank. *Complete with 10 Can Grids. This plant is equal to new* — 631
Brand New 8 to 10-ton Clear Ice-Making Plants—110 Cans—Electric or Diesel Drive—2 Can Pull — 632

Item No.

1—247 Can, 22-ton ice plants, like new — 632A
1—35-38 ton New Clear Ice Making Plants — 635
1—150 Ton Multi lift—1622 Can Plant — 636
1—702 Can Plant—9 Can Pull — 637
1—920 Can Plant—12 Can Pull — 638
1—150 Ton Ice Plant—2 Tank — 660

Traveling Cranes
2—4 Ton Overhead Traveling Cranes. 9 & 12 Can Grid.

Self-Contained Units
3—4x4 York & Fricks — 742
1—5x5 York—390 RPM — 743
1—4½x5 Lipman—360 RPM — 744
1—3x3 Worthington — 748
1—5x5 Frick—Forced Feed—400 RPM Latest Type — 758

Used Ice Cubers
1—300 lb. ULINE, fully automatic cuber — 501
1—50 lb. F & E Safety Cuber — 502

Condensers
3—100 ton shell and tube condensers retubed — 919
1—125-ton, Vertical Shell & Tube, 196 2" tubes — 921
1—120 ton, 216—2" retubed Vertical Shell & Tube — 922
2—20 ton Horizontal—retubed — 924

Ice Cans
2000 Cans—Like new—11"x22"x47" — 950

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REFRIGERATION EQUIPMENT

6 EUCKER STREET
RIDGEFIELD PARK N J

PHONE: DIAMOND 2-8554
CABLE ADDRESS: KEHOEINC

Classified Advertising

USED EQUIPMENT-Continued

FOR SALE—1500 ice cans 11x22x47-48—good condition, $2.25 each F.O.B. 1500 brass drop tubes 50c each. C. Hoffberger Company, 1517 N. Gay St., Baltimore 13, Maryland.

FOR SALE—One Connersville low pressure blower, size 60-B, rated cap. 360 cubic feet per min. Mounted on base and connected to 7½ h.p., 3 ph., 60 cy. 220 volt motor with flex. coupling. Bacu Ice Inc., 35 High St., Poughkeepsie, N. Y.

FOR SALE—27 ton electric York plant. 125 h.p. Worthington oil engine, driving electric machine generator. Natural gas or electricity can be bought. Flat River Ice & Cold torage Co., Flat River, Missouri.

FOR SALE—Model 20 ice vending station. Brand new. Equipped with two bag vendors, automatic coin boxes, three outside lights and aluminum outside surface. Our cost $4,300.00. Will sell for $3,800.00 F.O.B., Beloit, Kans. Hund Ice Co., Beloit, Kansas.

FOR SALE—Brand new latest type ammonia compressors. One 8"x8" Frick, two 5"x5" Worthingtons, one 5½"x5½" Vilter, all with V belt drives; also new 60 h.p. motor. All just as received from the factories. Address Box AP-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE

Slightly used Model 27, 26 and 51 Thermo Cuber ice cube cutting machines, capacity from 8000 to 20,000 cubes per hour. In perfect condition. Address Box MY-17, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—ICE PLANTS & EQUIPMENT

20-40-50-60 Ton Ice Plants — Immediate Sale
1—60 Ton Cap Vogt Tube Ice Machine. Complete with Compressors.
1—12"x12" Duplex Frick Ammonia Compressors direct connected to synchronous motor.
1—10"x10" York ammonia compressor direct connected to 60 H.P. synchronous motor 200 R.P.M.
1—10"x10" York ammonia compressor direct connected to 100 H.P. synchronous motor 200 R.P.M.
1—9"x9" ammonia compressor direct connected to 50 H.P. synchronous motor 200 R.P.M.
1—10"x10" York ammonia compressor 200 R.P.M.
1—8"x8" York ammonia compressor direct connected to 60 H.P. synchronous motor 360 R.P.M.
1—8"x8" York Ammonia Compressor High Speed.
1—6"x6" York Ammonia Compressor High Speed.
1—5"x5" York Ammonia Compressor High Speed. Can supply motors for all compressors.
1—6"x6" Voss ammonia compressor.
2—4"x4" H.S. self contained Units, York.
1—3"x3" Frick H.S. self contained Units.
1—25" dia.x10'-0" long 5 pass enclosed type ammonia condensors.
1—Horizontal Shell and Tube Condensors 39½" Dia.x14'-1" long 152-2" tubes 6 pass. Assorted sizes electric hoists and cranes ranging from 2 to 6 ton capacity.
2—Gifford & Wood Tiering Machines, 1-three and 1-four tier.
2—Gifford & Wood Creasey Ice Crushers, Various Sizes.
1—Scoring Machines Perfection.
2—Sheppard Cranes 4 and 5 ton capacities—3 motor jobs.
2000—Ice Cans, various sizes.
Brine Coolers, submerged shell and tube type, 1½" and 2" ammonia coils, approximately 10,000 feet.

Send Us Your Requirements on Any Equipment You May Need.

ENTERPRISE EQUIPMENT CORPORATION
77-79 Alexander Street, Yonkers, N. Y.
Phone: Yonkers 8-8118-9
Cable Address: ENEQCO

USED EQUIPMENT-Continued

FOR SALE—2 York 8x8 ammonia compressors belted to 40 h.p., AC motors, 220 volts, 3 phase, 60 cyl., complete with starting control boxes. $1250.00 each F.O.B. Wheeling. John Wenzel Company, P.O. Box 630, Wheeling, W. Va.

FOR SALE—One 20 ton electric raw water plant complete with two 9x9 compressors, 9x9 York, 6x6 Frick, 5x5 York; smaller sizes in self-contained units. Two 50 ton Vilter units, Freon, with motors and V-belts. Shell & tube brine coolers and condensers, ammonia receivers, oil traps, agitators, blowers, coils, oil engines, motors. Parke Pettegrew & Son Company, 370 W. Broad St., Columbus 8, Ohio.

FOR SALE

Vogt Automatic Tube—ice machine, will produce 60 tons of "crushed" ice per 24 hours. Equipped with 10x10 Frick compressors and all necessary equipment for full automatic operation.
70 ton York ice plant, electric driven.
30 ton York ice plant, electric driven.
10x10 York ammonia compressor direct connected to 300 r.p.m. synchronous motor.
10x10 York less flywheel w/coupling for Diesel drive.
6½x6½ York ammonia compressor.
500 Arctic Pownall ice cans.
Type 50 F & E cubing machine.
Miller ice scoring machine.
7½ h.p. low pressure blower, 7½ h.p. agitator.

JOHN F. CARSON
2829 N. Broad St.
Phone: BAldwin 9-5932 Philadelphia 32, Pa.

FOR SALE

1—Lipman 4½"x5" Ice Machine; Twin Cylinder, complete with 2 brine tanks. Machine purchased in 1948. Hotel Gibbons. Third & Ludlow, Dayton, O.

POSITIONS AND HELP WANTED

Position Wanted—Reliable engineer desires position with company that is operating freezer and storage plant. Will take charge as chief engineer; will also take charge of construction of new storage and freezer equipment. Best of reference furnished. South preferred. Address Box MY-20 ICE & REFRIGERATION, 435 N. Waller Ave., Chicago 44.

POSITION WANTED — INSULATION SALES ENGINEER—Low temperature specialist; commercial, industrial, marine. Selling, contracting, fabricating, field and engineering experience. Some organization and management experience. Early thirties. Eastern or Midwest preferred, but willing to relocate. Presently employed same capacity. Seniority rule handicaps advancement. Address Box MY-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

". . . your time is money"

. . . don't waste it by looking around for personnel or items to make your organization more efficient. A classified ad in Ice and Refrigeration will do the job for you quickly and at low cost. No matter what you need or have to sell, one of our readers will have it or want it. The same goes for personnel.

Rates are shown at the beginning of this section — closing date is the tenth of the month.

May we serve you?

POSITIONS AND HELP WANTED

POSITION WANTED — as chief refrigeration engineer of a large plant or group of plants. Capable of handling the supervision of all operation, maintenance, remodeling and erection. Capable of keeping the cost of the operating repairs and labor at a minimum. Am a young man with fifteen years experience in the erection and operation of large capacity refrigerating equipment including multi-stage operation. Member of N.A.P.R.E. Have ability to get along with people and to handle men. Presently employed as chief engineer of cold storage and food freezing plant. References available upon request. Address Box MY-4, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

ICE PLANTS—for sale

FOR SALE—Capital stock of The Crystal Ice Company, Ironton, Ohio, representing 700 can modern plant; downtown central location; 25,000 trade area; 10 company routes; 2 vendors; railroad siding. Terms available. Hudson Jeffreys, Attorney, 411 Center St., Ironton, Ohio.

FOR SALE—18 ton ice plant. Rebuilt in 1947. Large industrial, farming and oil community. One 9x9 and two 5x5 compressors. Gas powered engine. Blower type condenser. Would pay out in two good seasons. Per ton $1200. Immediate possession. Write P. O. Box 486, Stroud, Okla.

FOR SALE

6 complete Frick 15 ton ice plants practically new and just dismantled ready for shipment. Each consisting of 7x7 compressor, 50 h.p. motor, starter, gauges and board, evaporative condenser, float and accumulator, trunk type coil, discharge and suction lines, oil trap, ½" steel tank, 182—11"x22"x51" Knickerbocker cans excellent condition, rank top, 2 can electric hoist, sprinkler type dump, 2 can pressure type filler, double ice chute. For sale as complete plants, one or all, also will sell single compressor, or other part of plant as desired.

Call, wire or write
A. C. ROCHAT
1400 S. Gay St.,
Phone 5-1141 Knoxville 15, Tenn.

FOR SALE—New 12½ ton York ice plant, small locker plant and complete appliance store selling leading appliances. Ice business has been established over 30 years, nevertheless present building and plant are entirely new. Concrete block building with separate living quarters for two families on second floor. Ice sold retail through routes and vendor. No competition; most ideal climate for ice business in the United States. Year round sales with six months peak. This business is good substantial setup and would not consider selling if not for illness in family. Situated in Southwest in rich agriculture producing area. Business and property all clear. Address Box MY-12, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—35 ton electric driven, semi-automatic ice plant to be moved; location North Texas. This plant consists of two tanks; tank No. 1, 41'x26' inside measurements, 16 cans wide and 17 cans long, 272 forty-four inch short cans. Tank No. 2, 27½'x 19' inside measurements 15 cans wide and 11 cans long, 165 forty-nine inch long cans. One 9½x9½ Baker compressor V-belted FM 75 h.p. 2200 V. One 9x9 Frick compressor FM motor, 60 h.p., 440 V. One Frick shell and tube condensers, 84 tubes; one atmospheric condenser, 7 stands 18 ft. long, 8 coils high. Two air blowers, circulating pumps, tower pumps, two ice hoists, two agitators, floats and all auxiliary equipment. Ice crusher, Perfection ice scoring machine. International Carbex water softener. Can make ice out of any kind of water. Plant complete, operated last season. To be moved from the premises. Price $10,000, buyer to take out. Community Public Service Co., 1500 Electric Building, Fort Worth, Texas. Telephone Edison 3311.

FOR SALE OR LEASE
90-TON CAPACITY
ICE MAKING PLANT
SUITABLE FOR COLD STORAGE FILLING STATION IN CONNECTION ON MAIN ARTERY NORTH AND SOUTH EAST AND WEST THRU FAST GROWING MIDWEST CITY OF 200,000 POPULATION.

WRITE BOX MY-5
ICE and REFRIGERATION
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When you place your order with Barrett, you know you can depend on speedy arrival of ammonia of unexcelled purity and consistent high quality. Cylinder valves are in perfect working condition . . . and empty cylinders are picked up promptly. Convenient coast-to-coast stock points make it easy.

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In 150, 100 and 50-pound cylinders for fast delivery from a stock point located near you.

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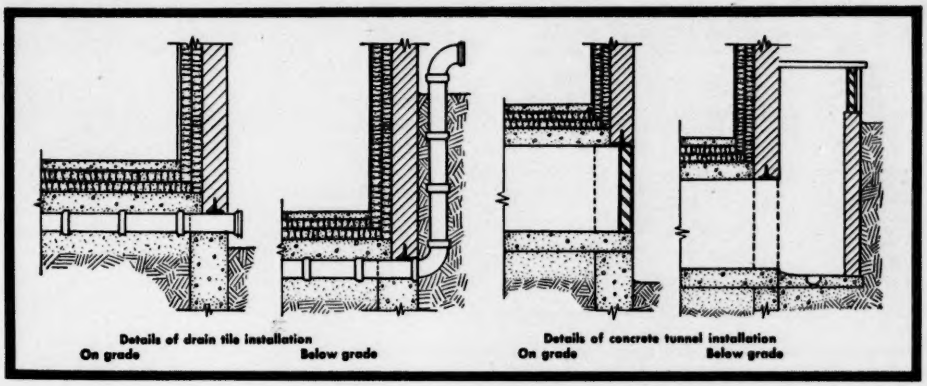


We have been asked . . .

"Is there danger of frost forming in the ground under a large, on-grade freezer?"

"I plan to build an additional hardening room on grade," writes an ice cream manufacturer. "Dimensions are to be 60′ x 80′. Will the 20° to 30° F. below zero temperatures of my room freeze the ground below it?"

HERE'S THE ANSWER:

It is quite common for frost to form under a large, on-grade freezer. What happens is that the heat is drawn out of the earth and through the floor faster than it can be replaced by outside heat flow into the ground at the edges of the building. The ground beneath the subfloor freezes and expands, exerting pressures that will buckle the floor and eventually cause complete failure of the room. The length of time required for damage to occur will depend upon soil conditions, quality of insulation, and general construction. No practical amount of insulation can prevent heat from flowing from the subsoil through the floor, and consequent lowering of earth temperature. Insulating materials retard rather than prevent heat passage.

To prevent frost damage, the soil under freezer rooms built on grade or below grade should be ventilated with air ducts spaced at regular intervals in a cinder or crushed stone fill under the subfloor. The ducts can be 6″ or 8″ drain tile on 6′ centers, or 2′ x 3′ concrete tunnels on 16′ centers. Both types should be laid across the short dimension of the room to provide for maximum circulation of air. The opening at one end should be lower than the other to create a draft, introducing sufficient warm air to keep ground temperatures above freezing and prevent formation of frost. When on- or below-grade freezer rooms are 20′ x 20′ or less in dimension, the ventilating system under the subfloor can usually be omitted. Armstrong engineers will be glad to advise you on the best method of guarding against frost formation under freezer floors. Ask their advice while your job is in the design stage. A call to your nearest Armstrong office at that time may save you future trouble and the needless expense of rebuilding a low-temperature room that has been ruined by frost.

SEND US YOUR QUESTIONS: If you have any questions on the construction of low-temperature facilities, please do not hesitate to write to us. We'll see that you get a practical answer. Just address a letter or post card to Armstrong Cork Company, 4505 Concord Street, Lancaster, Pa.

ARMSTRONG'S INDUSTRIAL INSULATIONS

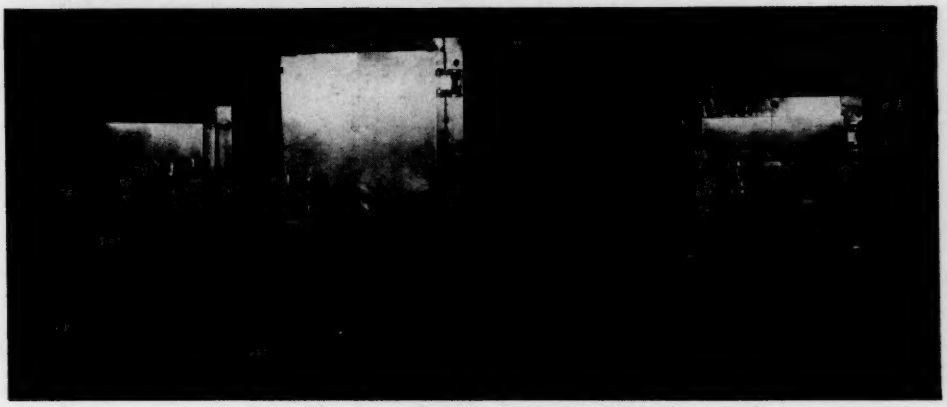
JAMISON Stainless Clad Doors

preferred for "SANITARY SHOWMANSHIP"

- FAR MORE SANITARY!
- EASIER TO KEEP CLEAN!
- MODERN DESIGN . . . GLISTENING BEAUTY!

IN THE STORE

Wendt Cream Top Dairy, Niagara Falls, uses the "Sanitary Showmanship" of Jamison Stainless Clad Doors both in the retail store and in the plant. Reach-in Door in the store leads to the sales Cooler.



IN THE PLANT

Stainless Clad, Super-Freezer Walk-in Door leads to the large Ice Cream Hardening Room. Super-Freezer Reach-in Doors, for speedy handling of cans and packages, are also of sanitary Stainless in keeping with the glistening, spotless, easy-to-clean tile walls. Sanitation and Cleanliness are by-words with all dairies . . . that's why they are buy-words with JAMISON.

For full information on the popular JAMISON line, write for Catalog 175. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.

JAMISON

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